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Hot Water for the Million

Charges and practical advice

READERS of the ELECTRICAL REVIEW need no convincing of the all-the-year-round benefits of electricity in the home. There is a larger public, however, who look upon electrical service as seasonal or merely supplementary.

It is wise to tackle this attitude energetically, and spring is the best time in which to do it. As the days get longer and warmer the housewife begins to think about spring-cleaning, and the vacuum cleaner comes instantly to her mind. All through the year she has probably been pestered by cleaner salesmen and even if she has steeled herself against them spring has a softening influence which makes her susceptible to the properly timed appeal.

Refrigeration, we know, is an all-the-year service. All the same the majority of people still think that it is only of significance in the summer. The first few flies remind the housewife that food will soon require to be protected from the wholesale depredations of these insanitary insects, and the refrigerator question ceases to be "Why?" and becomes "How?"

The coal fire is dispensed with as soon as possible and it can be abandoned sooner if convenient electric heaters are available to take off the morning and evening chills of spring and, incidentally, save labour and dirt.

A Valuable Load

All this means revenue for the electrical industry from the sale of appliances, but it does not represent a very important load for the supply undertaking. There is, however, one direction in which a steady consumption can be ensured—water heating

When the winter fires are dispensed with many fire-back boilers go out of use and the same is true of the coke-fired boiler, which can make the kitchen oppressively hot in spring and summer. But hot water remains essential and thus electricity is afforded an excellent opportunity.

This is no place for an exhaustive survey of this many-sided subject. For the latest review of the position and prospects we will refer readers to Mr. J. I. Bernard's recent I.E.E. paper. In this Mr. Bernard showed that the consumption of hot water, and consequently electricity, varied so much between different households that it was almost impossible to discover an average.

There seems, however, to be some connection between income and the use of hot water and Mr. Bernard estimated sixty gallons per day for families with an income of £500; twenty-four gallons for incomes between £250-£500; and only seven gallons for the large majority with incomes below £250.

The greatest potential aggregate electricity consumption was in the middle class, estimated at 8,000 million kWh. The total for the whole of the United Kingdom if electric water-heating became general would be 18,500 million kWh annually, nearly three times the present domestic consumption.

Such a load is worth going out for, but it cannot be obtained by ordinary methods and charges. In the first place few consumers are prepared to heat their water electrically at the usual secondary rate of a two-part tariff. It can be managed at the common rate of a halfpenny per kWh, ½d. is very favourable, but with a farthing rate the load should almost fall into the supply engineer's lap.

Off-peak Rates

Given ample storage the load is one which is admirably adapted to off-peak supply. The greater part of the heating-up can be done at night when it would pay the supply undertaking to offer a very attractive rate.

It is really necessary, however, to make up losses during the daytime by means of an intermittent supply or a lower-loaded element. There is now available a double immersion heater with separate loadings for day and night running. If it is possible to offer a sufficiently low rate ordinary thermostatic control may be sufficient but the supply authority will lose the benefit of the off-peak usage.

This cursory review of the subject is to draw attention to the water-heating campaign which the British Electrical Development Association is now conducting. Supply authorities can obtain from E.D.A. a great deal of telling publicity material and valuable technical data to aid them in getting the public to think about electric water-heating.

But all this assistance will be wasted unless supply engineers are prepared to do the major part of the work, which must consist of giving practical advice to individual householders and offering rates which put electric water-heating within reach of the majority of their consumers.

Power Station Sites

While there is much to be said for locating generating stations at some distance from the centre of gravity of the load if necessary in order to secure cheap land and other local advantages, the best of the argument, in Great Britain at least, usually lies with those who favour sites in industrial areas. Industry tends to be concentrated near abundant water supplies, which are also required for providing circulating water for the condensers. Largely for this reason the grid in this country is primarily a station-interconnecting rather than a transmission system. The use of industrial sites for power stations has great merits from the aspect of national defence since they are in protected zones and can use the grid either as a stand-by or as a means of aiding other areas in distress. Technical performance need not suffer as the substitution of new plant for less efficient units on existing sites has often raised the thermal efficiency of old stations to the high values expected nowadays.

Rotherham Plant Extended

A good example of making the most of an old site in an industrial district is furnished by the 25,000-kW extension to the Prince of Wales power station, Rotherham, which is described in this issue. Steam conditions, within the margin of operating skill and condensing-water temperature, may be said almost to preordain the thermal efficiency of a station. The steam pressure at this station has hitherto been only 220 lb. per sq. in., but for the new plant it is 625 lb. at 850 deg. F. Rotherham was a pioneer in the installation of big sets, having put in a 30,000-kW turbo-alternator at the end of the war. This ran at 1,500 RPM instead of the present standard speed of 3,000 RPM for units of similar rating. With the incorporation of the other great technical advances in the design of both boilers and turbines that have taken place since then, the station should now take a position among selected stations that is appropriate to its output of nearly 200 million kWh per annum.

Practical Testing

Operating figures of small power plants are not always reliable, as accurate instruments for testing performance are not available. On the other hand the requisite facilities are possessed by local technical schools which are on the look out for opportunities to give their students experience of how apparatus is expected to function in industry. An arrangement of this kind, reported in *Power*, gave students a real insight into practical conditions and at the same time enabled the plant engineer to effect useful economies and improvements as a result of the report, which was afterwards sent to him by the college authorities. It is suggested that tests of this kind are more effective if carried out as part of a serious thesis investigation by graduates or senior students.

"Chiefs'" Salaries

The misguided remarks made at a recent meeting of the Halifax Council, and referred to in our March 10th issue, have caused Alderman Walker, whose name is borne by the recommended scale of chief electrical engineers' salaries, to send the Press a statement of the position. This will be found on page 422 of this issue. The need for the new National and District Committees, consisting of representatives of municipal supply authorities and chief engineers, has become very apparent lately. Many of the recent advertisements for chief electrical engineers have offered salaries below those laid down in the Walker Scale and the positions have therefore been "black-listed" by the A.M.E.E. and E.P.E.A. The latter Association, as Alderman Walker says, has taken no part in the fixing of "chiefs'" salaries, but it is the source from whence "new" chief engineers are derived and therefore has a considerable interest in the matter. We must repeat that if the best men are to be secured for these important posts salaries equivalent to those paid outside municipal service must be offered.

Registration Questions

A correspondent, in a letter published in this issue, has read our last week's leading article on compulsory registration with "amazement." He seems to be bewildered mostly by the opinions expressed by Mr. J. W. J. Townley which we quoted and so we have left Mr. Townley to answer these. But we are responsible for the statement that "after all, installations, even in the largest towns, do not go in at the rate of hundreds a day." Our correspondent says, however, that in a town with half a million inhabitants the supply authority should be connecting up nearly two hundred installations per working day. There are about 280 working days in the year, so that on this basis the hypothetical town should connect up 56,000 installations a year. To do him full justice it must be said that some of the "installations" which he mentions are extensions, but the lighting connections should be new ones. His fifty a day would give 14,000 a year. There are only two English cities with populations approximating the given figure—Sheffield (518,000) and Leeds (492,000). In 1937-38 Sheffield connected up 5,934 new consumers and Leeds 6,339, an average for the two of about twenty-two a day.

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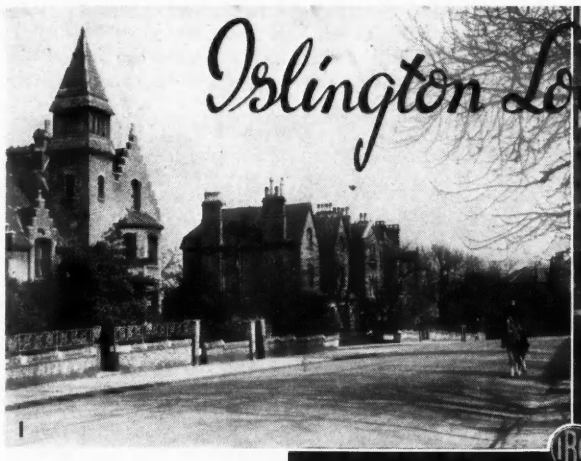
E.D.A. in 1938

A study of the report of the British Electrical Development Association for the past year will convince the most critical that E.D.A. earned its keep. In every department of electrical service its influence was felt and much of the credit for the connection of a further 700,000 or so consumers is due to it. The generous co-operation of manufacturers in the Association's work, while of course not entirely unselfish, shows that the reorganisation of six years ago has not had the adverse effects which some expected. Special mention of the Area Committees is called for. Their success has amply justified the decentralisation scheme instituted by the first director, Mr. J. W. Beauchamp, and extended by his successor, Lt.-Col. Vignoles. A few years ago there were doubts whether E.D.A. was a good investment for supply undertakings, but we do not hear such murmurs now. Most critics call for more expenditure in particular directions. If the funds are forthcoming E.D.A. can be relied upon to expend them wisely.

A Gruesome Note

The Hammersmith Electricity Committee reported to the Borough Council this week that it had approved a proposal that a circular advertising the facilities available at the Mortlake Crematorium should be enclosed with consumers' accounts for the March quarter. This may help the crematorium, but we can think of many better ways of encouraging the use of electricity.

Islington Local Building



1, 2.—The older type of property common in Islington and a large block of flats replacing it. 3.—The Electricity Department is a firm believer in publicity. 4, 5.—Electric cookers and water heaters are proving popular in these flats in Canonbury Park and Hanley Road *[Elec. Rev. photos.*

THOUGH not quite the largest of London's municipally served electricity supply areas (it covers 4¾ square miles), Islington with its 322,000 or so residents has the distinction of possessing by far the greatest population, which, moreover, is likely to increase as a result of the rapid replacement of the older type of property by large blocks of flats. It is also a boast that there is scarcely a single article not produced in the borough. These were the two features of the district which attracted us specially to investigate how the Borough Electricity Department (chief engineer, Mr. A. P. MacAlister, M.I.E.E.) is handling the development of its services.

Although the undertaking has been operating since 1896 and despite the large amount of residential property in the area, it is rather surprising to find that no real effort was made to develop the domestic load until about two years ago. There were, of course, very good reasons for this, the principal being the nature of the tenancies in this residential property. There were also a large number of the original rubber insulated cables, but these have now been replaced, and every street in the borough, irrespective of financial or economic value to the undertaking, has been provided with mains, work being now in hand for laying cables on both sides of the streets.

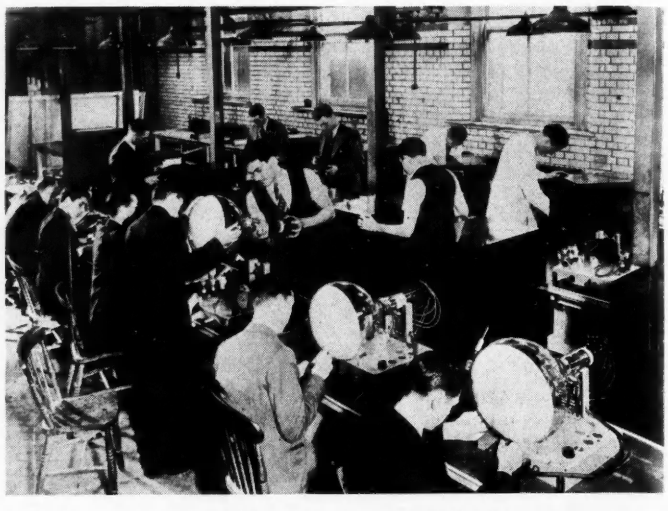
With the opening in January, 1937, of the Department's first showrooms and demonstration hall in Holloway Road, the new domestic era may be said to have begun. Starting virtually from scratch, the Department's record of progress in the domestic field may not yet appear very impressive, but most of the record number of new consumers (7,870) added in 1938 were in the domestic class, and at December 31st last the connected load of domestic apparatus (excluding lighting) amounted to 10,600 kW, nearly 15 per cent. of the total (72,272 kW).

The normally accepted and successful operations of municipal electrical development and trading, however, require particularly careful treatment in this area, the population of which is in a continual state of flux by reason of changes of tenancy, short leases and removals, last year there being almost eight thousand disconnections and reconnections. But the most striking peculiarity of all is that there are possibly no more than 7 per cent. of the consumers of the "owner-occupier" class. All the large old houses which have not yet made way for blocks of flats have been divided up into self-contained flats or unfurnished rooms.

One result of this is that practically no consumers take advantage of the hire-purchase wiring scheme (spread over three or five years, plus 7½ per cent. per annum of the cost of the installation). They naturally do not see why "they should do it for the landlord," and they much prefer the rental wiring scheme under which they pay 2d. per kWh above the standard flat rate of 2½d. for lighting. Although in this case the installation never becomes the property of the consumer, the option is given to purchase it at any time, depreciation being allowed according to the time it has been used. At the end of 1938 there were 14,092 rental wiring consumers, 3,388 more than the year before.

The domestic consumers may be said to consist almost entirely of very poor people or of wage-earners getting an average of from £4 to £6 per week, and electricity tariffs have had, therefore, to be framed accordingly. Special provisions have been made to ensure that cheap supplies are available for lighting, the flat rate for which (2½d. per kWh, plus 3½ per cent.) is one of the lowest in the country. The 3½ per cent. increase, by the way, is hoped to be only a temporary expedient. It was brought into force in October as a result of the increased price of coal, and it applies to all tariffs except the rental wiring consumers and the prepayment meter rate (3½d.). The latter rate, which is available for premises where the total installation is less than the equivalent of 150 W, does not, like other rates, incorporate a minimum charge (lighting 10s., power £1 per annum). It had been adopted by some 12,000 consumers at December 31st, an increase of 3,336 during the year.

Although of necessity lighting supplies have been the Department's primary consideration, recent encouragement to use electricity for other purposes is rapidly bearing fruit. Electrical energy for domestic power, heating and cooking is supplied under a three-year agreement at ¾d. per kWh, plus 3½ per cent. The undertaking has not the alternative of a general two-part domestic tariff, but the advantage of such a rate to the majority of consumers is doubtful when the lighting flat rate is as low as 2½d. per kWh with no meter charges. There is, however,



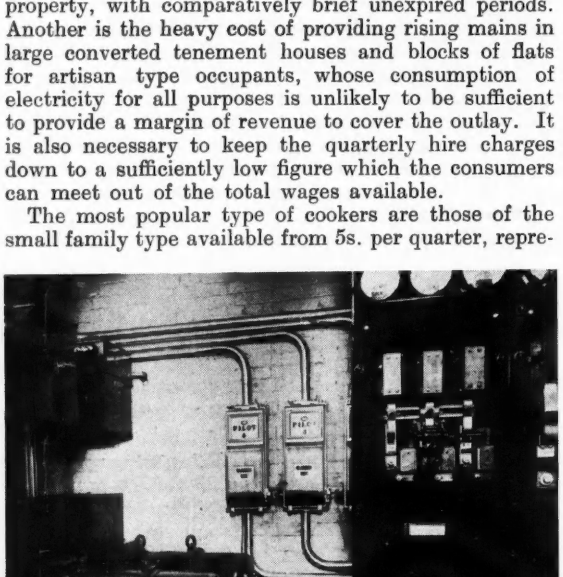
Television receiver manufacture is one of the latest industries requiring an extensive use of electricity. Here is seen part of the assembly bay at the Cossor works

a restricted two-part all-in tariff applicable only to housing schemes or blocks of flats comprising not fewer than 30 self-contained tenements. Under this arrangement the owners of the tenements are expected to collect a weekly fixed charge of 9d., the electricity consumed being supplied at 1d. per kWh.

The large number of changes of tenancy already referred to has a very marked effect on the hire of cookers. During the two years in which the hire scheme has been in operation 660 cookers have been installed, but no fewer than 100 have since been disconnected through their users having left the borough. While the hirers sign an agreement covering two years' minimum hire, this has little or no effective influence, as these tenancies are mostly weekly, and in the majority of cases they have left London for other parts of the country.

Besides a shifting population, there are several other difficulties militating against more rapid development of the cooker load. One is preponderance of leasehold property, with comparatively brief unexpired periods. Another is the heavy cost of providing rising mains in large converted tenement houses and blocks of flats for artisan type occupants, whose consumption of electricity for all purposes is unlikely to be sufficient to provide a margin of revenue to cover the outlay. It is also necessary to keep the quarterly hire charges down to a sufficiently low figure which the consumers can meet out of the total wages available.

The most popular type of cookers are those of the small family type available from 5s. per quarter, repre-



The B.T.H. capacitor pilot motor single-phase three-phase conversion plant at the Fescol works

senting some 85 per cent. of the connections. Larger types are offered at 6s. 6d., 8s. 6d. and 10s. per quarter. Mr. MacAlister favours the solid type of hot-plate, but would like to do away with the grill-boiler, which he considers a dirt-trap and as being wasteful in the general small household, the Continental housewife finding no necessity for this facility.

Eighteen months have passed since the installation of water heaters under simple hire terms was commenced, and in that time about 220 heaters have been connected. The small sink type and the larger thermal storage models have not proved so popular as in provincial areas, as a large proportion of the population are not in their homes during the day, many of the flats being purely of a dormitory character. The most popular unit has proved to be the unlagged high-loaded hand-controlled heater of 12-gal. capacity, which accounts for 55 per cent. of the connections. Some difficulties have been experienced in connection with water supply and pressure arrangements, more especially in converted houses divided into flats, and in many cases considerable additional plumbing has been necessary.

The attitude towards home laundry equipment is an interesting one. Wash boilers hired at 2s. 6d. per quarter, including 30ft. of wiring, have not been adopted to any great extent, as there are in the area several of the largest laundry companies in London, which specialise in all-in, bag-wash schemes at exceptionally low rates, and, in addition, the borough has three well-equipped public wash-houses. On the other hand, the electric washing machine has proved fairly popular on three-year hire-purchase terms. Nearly 100 have been disposed of through the showrooms during the past eighteen months, and there seems a fair market for models costing between 15 and 22 gns.

Demand for Fires

A promising field of development appears to offer itself in regard to electric fires, mostly for early morning and late evening use. Approximately 300 radiators have been sold by the Department for cash during the last two years, while a further 350 units of 2- and 3-kW capacity have been installed under the simple hire scheme at charges ranging from 3s. 6d. per quarter, including 30ft. of wiring. There is a limited demand for refrigerators. Due to frequent changes of tenancy such high-priced apparatus on which there is rapid depreciation calls for especial care in the consideration of agreements.

There has recently been an enormously growing business in the smaller appliances, such as cleaners, irons, toasters and hair dryers, particularly under hire-purchase agreements, some 1,500 of which have been entered into during the past eighteen months. Comparatively little has been experienced of the many troubles usually associated with hire-purchase trading.

The public much appreciate the services rendered by the showrooms, where high quality apparatus can be obtained with unbiased advice, in contrast with the numerous large stores and large shops where sales irrespective of suitability and service are very frequent. They also value the cooking demonstrations which are

given regularly once a week, or more often if required.

Turning to the power load, it would appear at first glance that there might have been difficulty in the development on account of the fact that the whole of the undertaking's 400/200-V. A.C. system of supply is single-phase, there being no alternative direct current or polyphase supplies. In practice, however, this has not proved a disadvantage, and some 5,500 motors, totalling over 29,000 h.p., have been installed. In large factories using a considerable number of motors extensive use has been made of the Ferraris-Arno system or some variation of it, whereby standard 400-V. 3-phase motors can be used, and the system has proved entirely satisfactory.

One of the most recent of these phase-conversion systems is to be found at the new electro-plating works of Fescol, Ltd. In this case the plant, which has been supplied by the B.T.H. Co., comprises convertors or pilot motors resembling ordinary three-phase motors and equipped with condensers. The single-phase supply is connected to two of the three terminals of the winding of each convertor, and three-phase is taken from all three terminals. The condensers, besides being used for starting the convertors, assist in the conversion and add to the efficiency. The system is claimed to be much cheaper to install, and to cost much less to run than motor-alternator sets.

A Varied Power Load

Altogether there is nearly 24,000 kW of power load connected, and to give an idea of the diversity of products manufactured in the borough we will mention just a few: Gut, egg powder, pianos and organs, pipework, tungsten, lead presses and dies, soda-water syphons, meteorological instruments, paint, bread, confectionery, cork, dart-boards, vacuum cleaners, cricket bats, tennis balls, wire netting, optical lenses, glass bottles, toilet preparations and clothing. Many of the factories have been erected in between domestic premises, and several converted private houses are utilised for manufacturing purposes.

Several electrical manufacturers, too, have chosen Islington for their works and utilise electricity for a wide variety of purposes. Wild-Barfield Electric Furnaces, Ltd., for example, besides employing electrically driven lathes, hacksaw machines, portable drills, grinders, etc., have installed both arc and spot welding sets, principally for fabricating the steel cases for their furnaces. This method of construction, incidentally, has effected a considerable saving in manufacturing costs over the old method of marking out, drilling, riveting or bolting together. The company also uses electricity extensively for test purposes, paint sprays, dust extraction, water heating, etc.

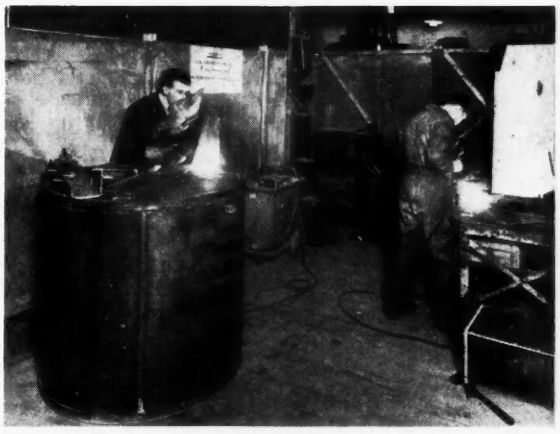
Radio and Television Factories

The seven large factories of A. C. Cossor, Ltd., radio, television and electrical instrument manufacturers, also employ electricity in a multitude of different operations, perhaps the most interesting and unusual of which are those in which the small metal valve parts are treated in tubular electric furnaces to remove the dust, grease, gas, etc., which is present in the pores of the raw metal.

An "ageing escalator" is another ingenious machine used for stabilising valve characteristics; it consists essentially of a continuous belt accommodating about a thousand valves at a time. The speed of the belt is carefully adjusted to give just the correct length of time for the process. Ordinary metal filament lamps plugged in sockets at the sides of the conveyor are connected to the valve holders and thus serve the double purpose of load resistances and short-circuit indicators. Valve filaments are first flashed and considerably overloaded, after which normal conditions ensue allowing emission to settle down.

In the assembly shops electric drills and soldering irons facilitate construction of chassis, whilst in the engineering works, presses, power shears, saws and other plant are electrically operated. Lifts, fans, conveyors and rotary printing machinery are also driven by electricity, which is also required extensively for testing and demonstration purposes.

Users of power for industrial purposes obtain their supplies under the same terms as domestic consumers



Arc-welding the steel cases of electric furnaces at the Wild-Barfield factory

(flat rate of ¾d. per kWh), but they stand to benefit by the discount of 10 per cent. allowed when consumption exceeds 500,000 kWh a quarter.

A special off-peak rate of 1½d. per kWh plus 3½ per cent. (10s. meter rent) is available for lighting factories and industrial premises, bakehouses, advertising signs, shop windows and garages. The same rate with a 5s. meter rent applies to cinema projectors.

Cinemas, of which the borough boasts no fewer than nineteen, are, by the way, the undertaking's largest classified consumers. Bakers' ovens, industrial ovens and furnaces, boilers of 5-kW capacity and upwards, heating come under another special off-peak tariff of ½d. per kWh plus 3½ per cent.

The borough sets its consumers a good example in its streets, most of the 120 miles of which are illuminated electrically.

Supply Statistics

Since 1928-29 the annual sales of electricity for all purposes have been more than doubled, and the figure for the twelve months ended March 31st last (58,937,505 kWh) was 6,984,847 kWh above the preceding year's total. The number of consumers at December 31st was 56,092, which was 7,870 more than the year before, while the maximum load occurred last December, when 28,300 kWh was recorded, the load factor during the last financial year being 28.82 per cent. The average price obtained per kWh was 1.45d., 170 kWh being sold per head of population for all purposes. Last year the Department showed a net profit of £27,905, of which £12,000 was contributed to the rates.

We have to thank Mr. MacAlister and his staff, especially Mr. W. E. Bradshaw, distribution engineer, for their assistance in the preparation of this article.

Apprentices in the Plastic Industry

THE Institute of the Plastic Industry has promoted a scheme for pupil-apprenticeship in the plastic industry, the aim of which is to assist in the provision of facilities for the systematic training and education of the young people entering the industry and to certify their standard of competence. The Institute does not prescribe any definite routine of training as this is a matter of arrangement between the employer, the apprentice and his parent or guardian. The certificate of the Institute will be granted at the discretion of the council, and a committee has been formed which will advise the council on all applications for certificates and will also advise employers and apprentices on any matters connected with the scheme. The Institute sets out in its scheme the general requirements for pupil-apprentices in the various classes. Further information can be obtained from the hon. secretary (apprenticeship), Institute of the Plastic Industry, Windsor House, Victoria Street, London, S.W.1.

Organisations of the Industry—IX

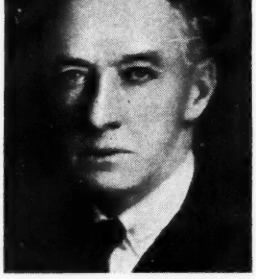
ACCUMULATOR MAKERS' ASSOCIATION

By F. C. Vine, Secretary

ALTHOUGH the Accumulator Makers' Association was formed in 1912, its roots go back into the nineteenth century. The stationary battery manufacturing industry was born in 1881 when secondary batteries, invented in 1859, were first brought within the realms of practicability. The manufacturers who formed the Association had all been engaged in the industry from its infancy and were thus able to contribute to the pool of general knowledge, experience gained in some thirty years of battery manufacture. The Association was started because its founders realised that the time had arrived when individualism must be replaced by intelligent and enlightened co-operation. It was to provide a means of ensuring such co-operation and a body in which to vest the requisite authority that the "A.M.A.," as it is now familiarly known, was brought into being.

Its first chairman was Mr. E. S. Jacob, who held office until 1915 to be followed in turn by Messrs. E. J. Clark, D. P. Dunne, C. R. D. Pritchett, F. J. Holmes and A. C. Soutter. Each chairman held office continuously for a number of years, a policy which has become traditional in the A.M.A. In 1928 Mr. E. S. New was elected chairman and has paid the inevitable penalty of efficiency by yearly re-election to that office ever since. Mr. D. P. Dunne is now president.

Mr. New was the first secretary and, having taken an active part in its formation, was well qualified to steer the Association through the difficulties of its early years. At first the Association was lodged in Mr. New's office, but after some seven years had grown to such dimensions that it was no longer an appropriate part-time occupation for a busy man and required the dignity of separate accommodation and the services of a whole time secretary. Lt.-Col. McLagan, D.S.O., was appointed and held office until 1929 when he was succeeded by the writer. Offices were taken in Parliament Street and here, under the shadow of Big Ben, the Association remained for eight years when the premises were found inadequate for its increasing staff. Obeying the general tendency the A.M.A. went "farther West" to its present habitat in Victoria Street.



Mr. D. P. Dunne, president, Mr. E. S. New, chairman, and Mr. F. C. Vine, secretary, of the Accumulator Makers' Association *[Photos: Fayr, London*

Like most similar Associations the A.M.A. devoted its earlier activities towards the establishment of a common and equitable selling policy. It stabilised discounts to electrical contractors, engine makers, manufacturers of all kinds of electrical equipment, and, indeed, to all classes of buyers. It defined the electrical contractor and made enactments to ensure his recognition and protection and his exclusive right to his appropriate discount. How much he needed protection is disclosed by the imposing list of bogus contractors who were excluded from A.M.A. lists of trade customers. Public tenders were scrutinised and anomalies and conditions inimical to the interests of manufacturer, contractor or user eliminated.

Standard conditions of sale were drawn up. These and a host of similar reforms were introduced and maintained until, in course of time, they became, by long usage, the established custom of the industry.

To give full effect to the stabilised trading conditions which emerged from these various activities it soon became obvious that regulation of technical matters was equally necessary and important. It was somewhat invidious to impose strict trading conditions without giving, at the same time, obvious reciprocal protection to the buyer. The A.M.A., therefore, gave close and constant attention to the policy of standardisation.

The rating of plate capacities, final voltages and voltages at intermediate and variable rates of discharge had for long been determined by the research, experiment and practical experience of individual members. These were now standardised. Storage batteries for all purposes and their components were dealt with as occasion arose until all members, without any sacrifice of the individual characteristics of their own products, could guarantee to their customers a standard quality of performance, coupled with equal and equitable conditions of purchase. This work was an unconscious anticipation of the excellent work of the B.S.I. which has drawn freely upon A.M.A. experience in the preparation of battery specifications.

In pursuit of objects of purely domestic importance, the A.M.A. inevitably came into close contact with bodies representing other organised trades. It had always co-operated very closely with B.E.A.M.A. and had been represented on its council for very many years. During this long association, negotations covering almost every phase of commercial activity have been successfully concluded. The election of Mr. E. S. New to the chairmanship of B.E.A.M.A. was a well-deserved testimony to him and to the Association. Both the English and Scottish Contractors' Associations have collaborated with the A.M.A. for many years and are still its loyal allies. The Telephone Development Association, in its work of encouraging the use of telephones, has been assisted by the A.M.A., which is represented on its council.

All such collaboration between these Associations concerned with various branches of the electrical industry undoubtedly prepared the way for the formation of the Electrical Fair Trading Council and the promulgation of its policy. In accepting that policy, the A.M.A. accepted the principle of autonomous sectional control under one central authority, while the Fair Trading Council endorsed the A.M.A. policy by its inclusion in their own.

Storage batteries are not only articles of general commerce but are essential components in equipment used by many public services. During the war, the Government had learned the advantage of dealing with organised industry. The various buying departments were quick to perpetuate the close collaboration inaugurated and practised during the war. They have drawn freely upon the manufacturing experience of A.M.A. members for data to prepare and improve their specifications so that the essential conditions of technical efficiency and economy might be met.

If the A.M.A. had done no more than regulate its home trade, it would have accomplished much but its influence has spread abroad throughout and beyond the Empire. Energetic overseas agents have stimulated interest in battery-using equipments until there is no corner of the earth, however remote, into which the ubiquitous battery has not penetrated. The foreign trade of the industry has been greatly helped by the stable conditions at home which have inspired the overseas buyer with confidence in its ability to deliver the goods, and stand by its guarantees. It is also deeply significant that battery imports into Great Britain are negligible, the whole demand being met by English manufacturers.

Although the A.M.A. is concerned, as regards standardisation, only with stationary batteries, it now concerns itself with matters of all kinds which affect the accumulator industry as a whole. When the Motor Traders' Association desired protection for the starter battery trade it was not difficult to apply A.M.A. principles through an appropriate Association to that section of the industry and the British Starter Battery Association was formed and has in five years acquired considerable prestige. It was quickly followed by the Portable Accumulator Makers' Association performing a similar service for the radio battery trade.

By pooling experience and co-operating in preventive and curative measures, A.M.A. members have eliminated the dread scourge of lead poisoning from their workpeople. They were not content with mere compliance with statutory requirements but have gone further and provided ameliorative conditions of labour and facilities for the enjoyment of leisure.

It can be claimed that the present robust health of the Industry is due in no small measure to the A.M.A.

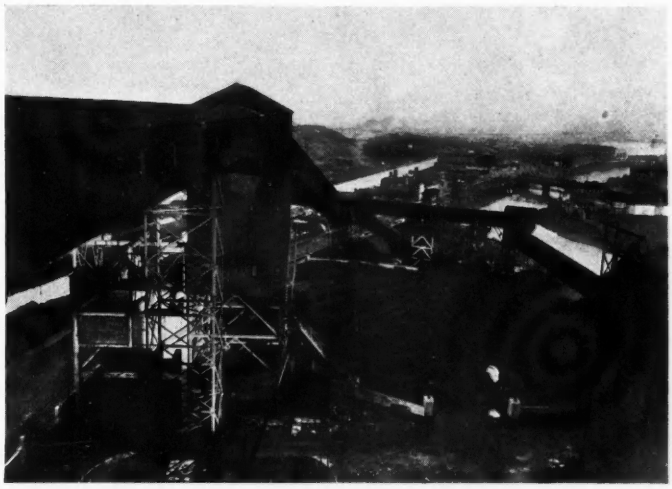
NEW PLANT at ROTHERHAM

25,000-kW turbo-alternator and two boilers

ON Wednesday a 25,000-kW turbo-alternator and two boilers were officially put into commission at the Prince of Wales power station of Rotherham Corporation.

The new turbine, which operates at initial steam conditions of 600 lb. per sq. in. and 850 deg. F., is a Parsons two-cylinder tandem reaction unit with a maximum continuous rating of 25,000 kW and a most economical rating of 20,000 kW. The set runs at 3,000 RPM, giving a peripheral speed for the alternator rotor of 445 ft. per sec., and has a first critical speed of 2,360 RPM.

A steam chest containing the combined stop valve and emergency valve, the governor valves and the overload by-pass valve is mounted alongside the turbine, to which it is connected by flexible steam pipes in order to avoid the transmission of stresses



Coal-handling plant at Rotherham power station

to the cylinder. Steam is expanded in the high-pressure cylinder, which has fifty pairs of blade rows, to approximately atmospheric pressure and is then led by a pair of overhead pipes to the centre of the double-flow low-pressure cylinder with its seven pairs of blade rows in each side, in which the expansion is continued to the exhaust vacuum. All blading is of stainless iron. Motor-driven turning gear, mounted between the cheeks of the l.p. cylinder exhaust, secures uniform cooling or heating of the rotors on shutting down or starting up.

Four-stage feed heating is employed at 4, 12.5, 45.5 and 111 lb. per sq. in. (abs.), giving a final condensate temperature of 324 deg. F. at the economical load, the last two heaters being on the boiler side of the pump. At economical output 36,400 lb. of steam is bled per hour. The condensing equipment, also by Parsons, formed part of the plant that has been replaced by the new turbo-alternator. It consists of two

Above: Central aisle of the boiler house. Right: The new generating set

7,190 sq. ft. cast-iron surface condensers containing in all 2,810 tubes ¾ in. in external diameter and requiring 19,200 gal. per min. of circulating water at 70 deg. F. to create a vacuum of 28.4 in. Hg. (bar. 30 in.).

The original reciprocating air pumps have been replaced by a steam-jet air ejector of a capacity of 100 lb. per hr., comprising two stages exhausting into a feed-water heater in which the main condensate is used as the cooling medium. A starting air ejector enables a vacuum of 20 deg. Hg. to be obtained in 5 min. Two motor-driven vertical extraction pumps, each capable of dealing with the full quantity of condensate (450 gal. per min.) against a 104-ft. head (including vacuum) are installed.

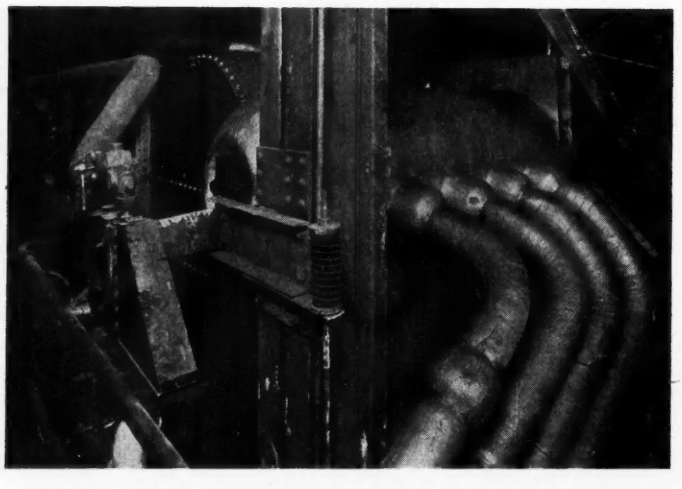
The alternator, which has a maximum rating of 31,250 kVA and an inherent reactance of 15 per cent. with a regulation of 30 per cent. at unity power factor and 50 per cent. at 0.8 power factor, generates at 6.6 kV, but can be connected for 11 kV. The stator, built up of electrically welded steel plates, is wound with Parsons special stranded cable, the individual cores being insulated and spiralled in a definite lay to eliminate eddy currents. Micanite is wrapped on to the conductor, which is then dried out and impregnated under vacuum. In order to reduce eddy-current loss, conductor ends are divided and connected by multiple joints to the end windings, which are copper strips in three banks held by mica wood packings and brass clamping pieces. For the same reason the end shields are of non-magnetic and non-conducting material one-fifth the weight of the ordinary metal shield which is Parsons' usual practice nowadays.

A 265-V exciter supplying 310 A at m.c.r. for the alternator field and itself excited by a generator on the same shaft is flexibly coupled to the alternator. Ventilation for the electrical end, on the multiple-inlet enclosed system, is provided by two fans, driven by Lancashire Dynamo & Crypto motors, with a combined duty of 60,000 cu. ft. of air per min.

Two turbine-driven and one electric feed pumps have been installed with individual capacities of 400,000 lb. per hr. against a discharge pressure of 900 lb. per sq. in. The turbines are of the three-stage type and run at 4,000 RPM, while the electric motor is a 696-HP. 2,940-RPM machine.

The new steam-raising units consist of two Lopulco tri-drum boilers each with a convection heating surface of 19,250 sq. ft. formed of a bank of 3½-in. (o.d.) by No. 4 gauge tubes, 60 units wide. They evaporate 150,000 lb. per hr. normally and 200,000 lb. as a maximum at

625 lb. per sq. in. and 850 deg. F. Their drums are 33 ft. long and together weigh 85 tons; they were forged solid from three ingots aggregating 500 tons in weight. The rear and bottom headers are 4 ft. in internal diameter and 3½ in. thick and that in front 3 ft. 6 in. by 2⅝ in. thick. The International Combustion Company's system of suspension is employed. Twin Underfeed L-type stokers, 32 ft. wide giving an effective grate



The top of the boilers and draught plant

area per boiler of 651 sq. ft. and arranged for firing coal, coke or a mixture, are driven by 4-HP DC 400-1,200-RPM motors. The combustion chambers have a heating surface of 2,850 sq. ft., consisting of 72 Lopulco finned tubes on the front and rear walls and 30 on the side walls. A "Melesco" superheater is fitted with Kent temperature control.

Senior economisers, with cast-iron H-section gills shrunk on to mild-steel tubes, impart the heat equivalent of 100 deg. F. to 200,000 lb. of water per hr. from a surface of 12,994 sq. ft., the gas passages of which are cleaned by Ivor soot blowers. Gas temperature is reduced to 273 deg. F. at c.m.r. and combustion-air temperature is raised to 295 deg. F. by means of an Usco plate-type air heater of 27,000 sq. ft. made up of 200 elements, 15 ft. by 4 ft. 6 in., arranged with gas passages ¾ in. wide and air passages $\frac{9}{16}$ in. wide. Corrosion is obviated by maintaining the temperature of the plates above 130 deg. F. through the recirculation of the heated air. A special welded construction is used to prevent leakage between air and gas passages.

Howden draught fans (two of each type per boiler) driven by Lancashire Dynamo & Crypto motors, are installed. The forced-draught fans, delivering 47,000 cu. ft. of air per min. at 130 deg. F. and 7.6 in. w.g., are driven by 35-85-HP 725-970-RPM motors and are associated with damper control. The duty of the vane-controlled induced-draught fans is 62,000 cu. ft. per min. at 295 deg. F. and 5.2 in. w.g.; they are driven by 85-135-HP 580-725-RPM motors and incorporate scroll dust collectors designed for a maximum dust concentration of 0.4 gr. per cu. ft., of which not more than 37½ per cent. may exceed 20 microns in diameter. Secondary air at the rate of 6,250 cu. ft. per min. at 295 deg. F. and 10 in. w.g. is provided by fans driven by 20-HP 1,440-RPM motors.

A Bailey automatic combustion control system varies the speeds of the draught-fan and stoker motors with rise and fall of the boiler pressure. All the instruments, including those for the automatic control, by Bailey Meters, Ltd., are mounted on a panel on the firing floor. Allen West & Co. were responsible for the electrical equipment for this purpose.

Coal is taken to the boiler house either direct from railway wagons or from storage. An Usco-Beaumont drag scraper plant with a capacity of 100 tons per hr. stores and reclaims coal to 9,000 and 4,000 ton piles. An Usco sluicing system is capable of delivering 20 tons of ashes per hour (enough for the ultimate requirements of the station) to a sump, 25 by 25 by 30 ft. deep, from which they are discharged into an overhead bunker for loading into lorries. Cleanliness of the ash basement is a feature of this plant.

The building is on a piled site in close proximity to the River Don. In the boiler house, a steel-framed structure 107 by 52 by 102 ft. high, the layout is arranged with a central firing aisle. The bunkers are on the centre line and immediately above them is the chimney which, with an inside diameter of 13 ft. and a height of 156 ft. 8 in. from basement level, is large enough for two boilers.

The extension was designed and constructed under the supervision of the borough electrical engineer, Mr. W. H. Duffett. The main contractors for the boiler house, including coal and ash-handling plant, stokers, air heaters, casing and ducting, were International Combustion, Ltd., and for the turbines and condensing plant, C. A. Parsons & Co., Ltd. Other manufacturers not previously mentioned include Babcock & Wilcox, Ltd., traversing chutes; Benjamin Electric, Ltd., lighting fittings; British L. M. Ericsson Co., telephones; Brookhirst Switchgear, Ltd., boiler group motor starters; Cambridge Instrument Co., Ltd., instruments for turbine and boilers; Geo. Ellison, Ltd., starters for turbine oil-pump motors; General Electric Co., Ltd., current-limiting reactors, station transformers, 440-V auxiliaries switchgear, motors and starters for extraction pumps; J. H. Holmes & Co., Ltd., turbine oil-pump motors; Metropolitan-Vickers Electrical Co., Ltd., motors and starters for coal and ash-handling plant; Norrington & Landon, Ltd., floodlights; Parmiter, Hope & Sugden, high-rupturing capacity fuse distribution board; Pyrene Co., Ltd., fire fighting apparatus; Revo Electric Co., Ltd., and Wardle Engineering Co., Ltd., lighting fittings; A. Reyrolle & Co., Ltd., main station auxiliaries switchboard.

Parliamentary News

(BY OUR SPECIAL REPORTER)

Scandinavia and the B.B.C.

ON March 15th Sir W. Davison asked the Postmaster-General whether he was aware of the difficulty experienced in Scandinavian countries in hearing British wireless broadcasts in view of the fact that the Droitwich wavelength was so close to the wavelengths of Copenhagen, Stockholm and Oslo, so that Scandinavian licence-holders who wished to hear foreign broadcasts were practically confined to those from Germany; and what, if any, steps were being taken.

Sir. W. Womersley, Assistant Postmaster-General, said that he was aware of these difficulties. He understood, however, that several British stations could be satisfactorily received by Scandinavian listeners after nightfall on modern receiving sets, and that the short-wave programmes from Daventry should be heard satisfactorily on suitable receiving sets throughout the day and during the evening until 11 p.m. He would bring the question to the notice of the British Broadcasting Corporation, but wavelengths and power were limited by international agreement.

North Metropolitan Bill

The North Metropolitan Electric Power Supply Co.'s Bill was considered on March 16th by the House of Lords Committee on Unopposed Bills. Lord Onslow presided. This Bill changes the name of the company to the Northmet Power Co. For the purpose of extensions to the Willesden generating station which are to be made by direction of the Central Electricity Board power is given for the acquisition by the company of five acres of land from the Willesden Company, and for the sale of the generating station to the North Metropolitan Power Station Co. Provision is also made for the transfer of the Hendon undertaking to the company. The committee ordered the Bill to be reported for third reading.

Planning the Modern Home

ON Tuesday last 300 members of the Central England Federation of the Electrical Association for Women gathered at Rugby, as guests of the British Thomson-Houston Co. and the Hotpoint Electric Appliance Co., Ltd., to discuss "How the E.A.W. Can Help the Architect and Builder in Leading the Public to Accept the Electrical Home." A tour of the new B.T.H. lamp works preceded a luncheon in the Co-operative Hall given by the Hotpoint Co., over which Mrs. Knight, B.A., chairman of the Federation, presided.

Mr. H. A. Lingard welcomed the conference, and in reply Miss Haslett, the Director, thanked the companies.

A most profitable afternoon was spent in considering the main subject of the conference, "Home and Kitchen Planning." Miss Edna Mosely, A.R.I.B.A., put the architect's and woman's point of view in an informative address illustrated by lantern slides showing the necessity for sufficient working surfaces, adequate lighting, and properly placed shelves and cupboards. A lively discussion followed, opened by Mr. H. G. Middleton, Rugby borough electrical engineer.

Miss Mosely stated that the main needs of the housewife—shelter, security, sufficient and palatable nourishment, cleanliness, delight in her home and leisure—were most easily obtainable by electricity. She stressed the importance of considering the exact labour-saving function of every piece of apparatus, stating that the right and fullest use of each was more important than the actual number of appliances installed.

SILK FACTORY LIGHTING

Effective use of discharge lamps

By E. Douglas Boult*

THE new Factories Act which came into force last July has called the attention of many, who would otherwise have continued to ignore it, to the all-important question of factory lighting. Too little attention has been given in the past to the importance of adequate lighting in relation to the health, and consequently to the capacity for both quality and quantity of work, of those engaged in the production of processed and manufactured goods, although it is one of the most important means of reducing production costs.

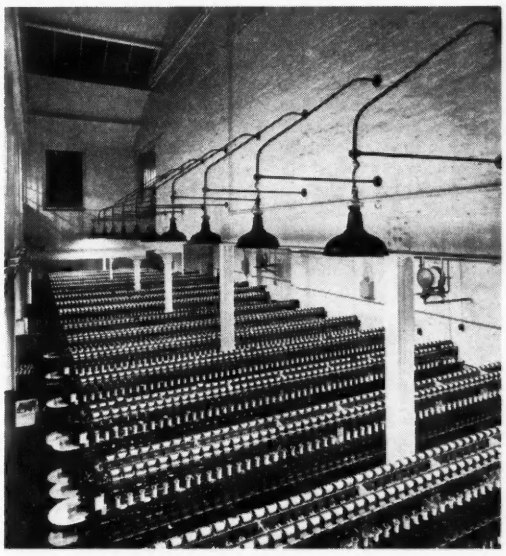
In no industries is the illumination factor so important as in those where fine and delicate work is being carried on by night as well as by day, and under this head the spinning and twisting of the silk threads produced by the silk-worm undoubtedly falls and is, perhaps, the most important under the sub-heading of textile processes.

It is, perhaps, not generally known that the spinning and twisting of real silk threads for such trades as the hosiery and silk weaving trade involves the processing of threads of diameters as small as two-thousandths of an inch and of a colour so "natural" in the untinted form as to make it difficult to distinguish them at all when not bunched together in skeins or bundles.

In these days when ladies' silk stockings are so perfect and delicate a product, the spinner or "throwster" who prepares the yarn from the silk worm's almost spider-like threads, spends the whole of his time in trapping and eliminating the faults which the silk-worm, and the Chinese or Japanese reeler who unwinds its cocoon, has made or allowed to pass unchecked. It is consequently of the utmost importance that the silk throwster should have the best and most efficient form of lighting in his factory, for the worker's eye must be keen and active the whole time, whether in daylight or under artificial lighting, in order that the product shall be as perfect as possible before it is handed on to the knitter or weaver.

It is for this reason that one of the largest firm of silk throwsters in this country, G. H. Heath & Co., Ltd., of Macclesfield, and their associated company, British Crepe, Ltd., have always paid particular attention to the illumination factor; they were among the first in their trade to see the possibilities and advantage in the use of the mercury discharge lamp.

After years of experiment with all forms of lighting they immediately appreciated the value of these new lamps when they were marketed of a size to be of service to them and in their experiments and installations Siemens Electric Lamps and Supplies, Ltd., worked with them to produce what may now be considered to be some of the most efficient and effective lighting schemes of their kind not only in their particular trade, but over a wide range of other industries as well.



Section of one of the spinning rooms in Messrs. Heath's No. 2 Mill, Middlewich

The illumination given by a "Q.H." discharge lamp has the peculiar property of picking out detail in clear cut lines and in particular it seems to pick out silk thread without any special background, so that it appears more like a silver wire, standing out to show itself in its path over the machines.

Another consideration of importance is the fact that, owing to the absence of the "red element" from this type of light, the effect which it has on colour is not the same as in the case of the ordinary gasfilled electric lamp. While it is not possible to carry out colour matching under discharge lighting, yet the distinction of shades is, if anything, easier and more marked than under gasfilled lamp illumination. The latter is, of course, no use for matching of colour anyway, but it has been claimed that the use of a certain proportion of gasfilled lamps in conjunction with mercury discharge lighting produces a light which is as near daylight as has yet been attained.

Messrs. Heath & Co. do not use gasfilled lamps at all in their installations and rely entirely on the Siemens "Q.H." or quartz type lamp to give them what they require. They find that where no matching of colours is required the results are not only adequate, but distinction is more easily made between the various colours used for identification purposes in spite of the fact that all those colours do not show up in

* Chief Engineer, G. H. Heath & Co. Ltd., Macclesfield.

A view of the winding department of the No. 1 Mill of British Crepe, Ltd.

their true daylight shades. Most people who have colour matching to do confine their efforts to a small room specially lighted for the purpose, or to individual lights under special glass filter screens.

In planning their lighting schemes Messrs. Heath had to consider points of view which do not ordinarily worry the designer of a normal gasfilled lamp scheme. For instance, the discharge lamp working on AC is liable to produce stroboscopic effects when illuminating rooms in which machinery is running; this means that, where speeds of revolution coincide with the cycles per second of the supply, or their multiples, the lamps can give the impression to the eye that the revolving part is stationary, whereas it may actually be revolving thousands of times a minute. The possibility of trouble in this respect has been eliminated after very careful experiments in the various rooms under various conditions and the value of the forethought shown is proved by the excellent results obtained. Stroboscopic effect is entirely absent in their workrooms lighted in this way; this point is of great importance in a works where the greatest part of the machinery consists of revolving spindles and shafts whose accuracy of speed is of vital importance.

Silk spinning machines are often 6 ft. high and very close together, and their adequate lighting involved considerable experiment and most careful planning by Heath's engineers, in conjunction with Siemens experts. In many cases, too, the height of the rooms varied and different ceiling heights in the same room, varying from 10 to 20 ft. or more, made the problem of even light distribution and the selection and fixing of fittings a difficult one but, as will be seen by the illustrations, it has been entirely overcome.

Expense Fully Justified

The excellent results obtained mean increased efficiency in a works where quality is of the utmost importance and where the standards of working conditions and organisation are exceptionally high. In this case the improvement in comfort to the workers' eyes and ease of fault detection have more than justified the expense and trouble involved.

It is necessary to employ a choke with each discharge lamp, and the way in which these chokes have been accommodated goes to show how careful thought beforehand can make a neat and successful job out of what might have been an unsightly installation. Condensers are also necessary to correct the low power factor of discharge lamps and in this case Messrs. Heath were fortunate in having an existing condenser plant fully capable of dealing with the extra load.

Benjamin fittings were used throughout and are giving very satisfactory results. The quality of light given by the Siemens "Q.H." lamps has been found excellent, as has the effective life of the lamps; the sizes employed are 125 W and 80 W according to the size and height of the rooms.

In passing through the works, one is struck by the lack of shadow in the rooms; this is largely due to the peculiar quality of penetration possessed by the mercury vapour discharge lamps, as well as the efficiency of the fittings and the layout of the lighting points. One of the great advantages of this type of lamp, apart from its value from the production point of view, is the economy of its running cost. The discharge lamp consumes only about one-third of the energy of a gasfilled lamp of equal illumination, and, in addition, gives a better light and the advantage of this needs no emphasis, particularly to those who have a maximum demand charge to pay to their supply authority.

Energy Costs Halved

The installations illustrated were actually wired and installed under the supervision of Messrs. Heath's chief engineer by the Mid-Cheshire Electric Supply Co., Ltd., Northwich, in their Middlewich factories, and in one case a room was equipped with 6.7 kW of discharge lighting, giving approximately 13/15 ft.-candles intensity, whereas the same room lighted by the older method by gasfilled lamps would have required 14.5 kW to give only an average lighting intensity of 7 or 8 ft.-candles. Hence, both the maximum demand and the "unit" consumption are down to half.

The accompanying illustrations were all taken by night and the only illumination used was the light given by the installations themselves; in fact, the Spinning Department shown was under production and the girls were moving about the room at the time (they do not appear, of course, because the photograph was a time exposure). These illustrations, incidentally, show what it is possible to do with an existing factory taken over from another industry, for the buildings photographed were, a few years ago, parts of a condensed milk factory abandoned under a reorganisation scheme.

It is interesting to note that in the case of the photographs of the Winding Departments the silk skeins on the machine are coloured from cream to red and purple, &c., but the illumination appears to be unaffected by the colour of the silk, for the light is even over the whole range of machines.

It is not yet possible to say whether the new fluorescent lamp which, it is claimed, has a great degree of colour correction, will find application in the silk industry for it has, as yet, had no extensive trial. It will, however, almost certainly help to widen the field for discharge lighting applications and will make an appeal to those to whom colour matching and distinction are all-important factors.

Who Fixes "Chiefs'" Salaries?

Some illusions dispelled

IN our issue of March 10th we had occasion to draw attention to a discussion on the subject of the salary to be offered by Halifax Corporation in advertising the position of borough electrical engineer.

Statements made during the debate showed that members of the Council were not aware of the nature of the "Walker Scale" by which chief engineers' salaries are governed. It was suggested that these officials fixed their own salaries and endeavoured to force them upon the municipal supply authorities. Erroneous references were also made to the part played by the Electrical Power Engineers' Association in this matter.

This has called forth a statement of the facts from Alderman W. Walker, to whose efforts the formulation of the scale was largely due, as is suggested by the application of his name to it. He is also chairman of the new national body mentioned below.

In the course of this Alderman Walker says that it is difficult to imagine any responsible local authority representative assuming that the slightest countenance would be given to any scale of salaries drawn up by any association of chief officials acting *ex parte*.

The allegation that in the past the E.P.E.A. has had a voice in the fixing of chief engineers' salaries is said to be absolutely without foundation. The Association has never been recognised by the employers as having any interest in chief engineers' salaries, nor has it ever claimed to have such an interest.

The speakers in the debate entirely overlooked the fact that there is a new organisation in which neither the E.P.E.A., the Ministry of Transport nor the Electricity Commissioners (who were also accused of complicity) plays any part whatever. It is composed of elected representatives of municipal electricity authorities and of chief electrical engineers.

The representatives appointed by the authorities to look after their interests in the new organisation (the National Joint Committee of Local Authorities and Chief Electrical Engineers) to revise the scale are Councillor M. Bloom (West Hartlepool), Alderman W. Walker (Manchester), Alderman Sir Percival Bower (Birmingham), Councillor W. H. Bickham (Swindon), Alderman S. F. Johnson (Southend), Alderman W. H. Shaw (Walthamstow), Alderman W. J. Lewis (Cardiff), and Alderman F. Callard (Torquay).

Alderman Walker concludes by saying that all new organisations suffer from attacks of this kind, but obstructive criticism from without is useless: instructive criticism from within is helpful. He therefore urges the opposing minority of local authorities to join the new organisation and ventilate from within any alleged defects in the existing scale in order that the revised scale may be acceptable to all local authority undertakers.

The letter is accompanied by a copy of the constitution of the National and District Joint Committees dated November 25th, 1938. The National Committee will consist of twenty-six members representing both sides equally while the thirteen District Committees will each have twelve members.

The functions of the National Committee are:—(*a*) To make recommendations from time to time concerning the salaries and conditions of service of chief electrical engineers, including the preparation of a revised scale of salaries and conditions of service; and (*b*) To make recommendations to both parties in relation to any difficulties which may arise between a local authority and a chief electrical engineer concerning his salary or conditions of service and in respect of which the District Joint Committee has not been able to agree upon a recommendation. At the request of either side, any difference upon which agreement cannot be reached by the National Committee may be submitted to the Industrial Court for arbitration.

ELECTRICAL DEVELOPMENT

E.D.A's busy year

THE principal guest at the annual luncheon of the British Electrical Development Association at Grosvenor House last Friday was H.R.H. the Duke of Kent, who was able from personal experience to give a testimonial to the benefits bestowed in every direction by electricity.

He proposed the toast of the Association and said that although, with an industry based on steam, we started late in industrial electrification we were rapidly making up the lost headway. Domestic electricity was as cheap as, or cheaper than, in any other country, and our advantageous charges had put us in front of the United States in the matter of electric cooking.

The Electrical Development Association, formed twenty years ago as a "spearhead of publicity," was now much more than that. Among other things it encouraged the reduction of charges and trained salesmen for the industry. His Royal Highness made particular mention of the excellent display arranged by E.D.A. which he had seen at last year's Royal Show. He also mentioned the work being done in the improvement of factory lighting.

In the course of his response to the toast, Lord Lytton, president of the Association, said that 75 per cent. of the motive power used in industry was supplied by electricity, of which 60 per cent. was taken from public supply. He considered that in the event of war public supply would prove more reliable than private plant. In this connection he referred to the emergency switchgear and transformer pool.

Another matter was transport. Those authorities who were scrapping their trams should remember that Diesel or petrol-driven buses had to rely upon imported fuel, while trolley-buses used coal-produced electricity and thus gave greater security and provided employment in the mining industry.

Speaking of the tremendous progress made in the domestic sphere, Lord Lytton said that we were gradually overtaking the Americans in this matter. Every week 4,000 housewives changed over to electric cooking and 1,600 water heaters were installed. He stressed the cheapness of the supply; prices had decreased as output had risen.

The Association was formed nearly twenty years ago, and he paid a tribute to the directors, Mr. J. W. Beauchamp, Lt.-Col. E. B. Vignoles and Mr. A. C. Cramb, two of whom, Mr. Beauchamp, the first director, and Mr. Cramb, the present one, were at the luncheon. The aims of E.D.A. included better salesmanship and electrical practice, standardisation of apparatus and unification of tariffs. Recently it had inaugurated an electric kitchen planning service.

In conclusion, he referred to the great recent developments in electric street lighting, and he thanked the Duke of Kent for his interest in the Association.

On behalf of the Association Brig.-Gen. R. F. Legge then presented to His Royal Highness a handsome model train, electrically operated, which, he hoped, would amuse Prince Edward.

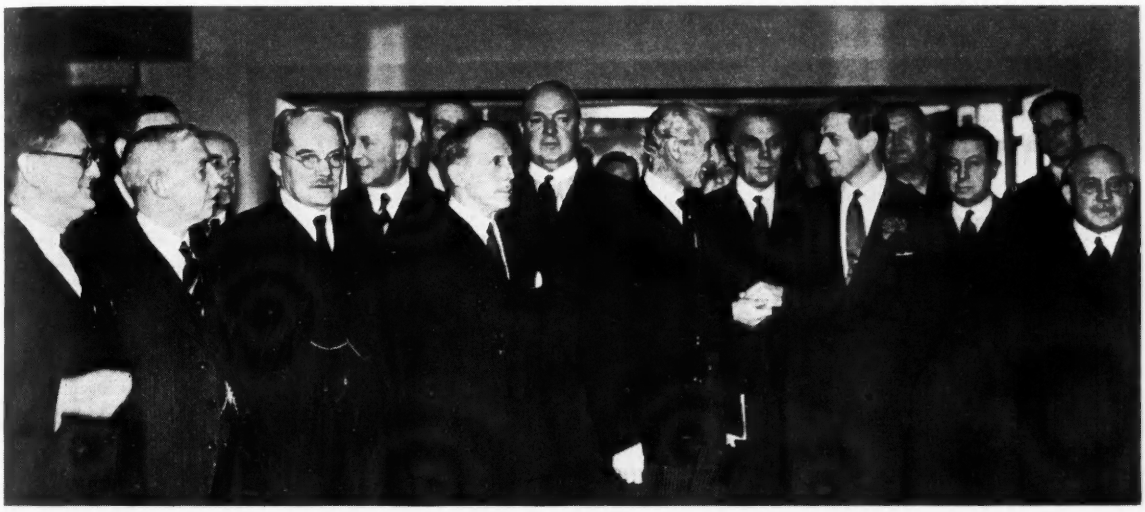
At the subsequent annual general meeting the report and accounts for 1938 were adopted. The accounts showed a total income of £112,606 and an expenditure of £112,903, leaving a small adverse balance. The number of members was reduced from 444 to 418 due to amalgamations, but the subscriptions and donations increased from £105,456 to £112,133, including the £50,000 from the Central Electricity Board.

The report is a most exhaustive one, dealing in some detail with the Association's multifarious activities during 1938. We have reported these from time to time and can only give a brief summary of the voluminous document.

It is stated that in spite of the apparent decline in membership, explained by amalgamations, there were actually nine new members. Co-operation with the manufacturing side of the industry was exemplified by the successful "Better Light —Better Sight" and refrigeration campaigns carried out in conjunction with makers of lamps and refrigerators. A record sum was made available for the refrigeration campaign.

The co-operative idea was also successfully introduced in the arranging of displays at the Empire Exhibition, Glasgow, and the Woman's Fair, Olympia.

Satisfactory progress is being made by the Association's domestic salesmanship course. At the close of the year there had been 1,640 enrolments; of these 995 students have gained the certificate, 39 with distinction. In addition, 300 domestic salesmanship diplomas and 37 sales engineers' diplomas have been granted.



The Duke of Kent and Lord Lytton with members of the E.D.A. Council at last Friday's luncheon. Mr. A. Nichols Moore, the new chairman, is on the right of the photograph *[Photo. by "The Times."*

The amount spent on national advertising during the year was almost twice the sum represented by the entire income of the Association six years ago. This practically continuous advertising was supplemented by an approximately equal expenditure by members in local newspaper advertising.

The Association is now one of the largest organisers of exhibitions in the world, and the aggregate number of people drawn yearly to shows either directly or indirectly under its ægis runs into millions. From five exhibitions alone in 1938 it is computed that two million people received the electrical message. The complete electric farm staged by the South-West England and South Wales Area Committee was the main feature of attraction at the Royal Show, Cardiff.

During the year a library of propaganda films was inaugurated in response to many requests from membrs.

The National Committees dealing with various aspects of commercial development carried out an extensive programme, including the organisation of conferences on street lighting, air conditioning and pumping. The preparation and adoption of a standard marking and method of operation of cooker thermostats was another important piece of work.

The services of the headquarters technical staff were increasingly in demand. A notable development was the establishment of a comprehensive electric kitchen planning service.

The report deals in some detail with all these activities, and twelve pages are devoted to the work of the nine Area Committees, the Electric Vehicle Association and the E.A.W.

At the meeting, over which Lord Lytton presided, Brig.-

Gen. Legge presented the accounts, the adoption of which was moved by Mr. T. A. G. Margary, seconded by Mr. H. J. Randall. Mr. E. W. Tole asked the Council to consider the allocation of more money to rural development and agricultural shows. Lord Lytton said that the matter was already under consideration. The accounts were adopted.

In presenting the report, Gen. Legge mentioned a number of "high spots." He said that they had produced three short talking films and were contemplating some even shorter ones. After a reference to the excellent display at the Royal Show, Cardiff, he dealt with the salesmanship courses, the form of hire-purchase agreement which had been produced and the kitchen planning service.

Mr. F. W. Purse, who moved the adoption of the report, emphasised the importance of salesmanship, and said that the bulk of the entries came from company undertakings. He urged the municipal authorities to encourage their staffs to take the course. The motion was seconded by Mr. L. Howles, and Lord Eltisley reminded the meeting that this year's Royal Show was being held at Windsor and called for a special effort.

Another speaker suggested a brighter stand and a better electrical display at the next British Industries Fair. He asked the Council to take the matter up with electrical manufacturers. The report was carried.

Gen. Legge reported that Lord Lytton had consented to serve as president for a further year, and proposed a vote of thanks to him. Mr. E. E. Hoadley seconded the vote, which was carried with acclamation. The president reported that Alderman Dudley Stuart and Mr. G. W. Partridge had been appointed vice-presidents for the period 1939-1942.

In moving a vote of thanks to the retiring chairman of the Council, Mr. A. Nichols Moore said that Gen. Legge had been largely responsible for the staff superannuation scheme and had given much encouragement to the salesmanship courses. Lord Pentland seconded the vote, which was enthusiastically accorded. Gen. Legge briefly replied.

Alderman Dudley Stuart proposed a vote of thanks to the technical Press and chairmen and members of all the E.D.A. committees, which was seconded by Mr. R. Birt. The proceedings concluded with a vote of thanks to Mr. A. C. Cramb, who in reply paid a tribute to his staff.

At a subsequent meeting of the Council Mr. A. Nichols Moore was appointed chairman and Mr. F. W. Purse vice-chairman for the ensuing year.

Electrical Wholesalers

Federation's silver jubilee year

DURING the past year a scheme of collection on behalf of the Electrical Industries Benevolent Association has been initiated among the members of the Electrical Wholesalers' Federation and when the annual dinner of the Federation was held at the Savoy Hotel, London, last week, the president, Mr. W. Yuille, was able to hand a cheque for £500 to Mr. J. N. Stephens, chairman of the Executive Court of the E.I.B.A.

He said that in the past their efforts had been disjointed, but they hoped that from now onwards year by year they would have a substantial cheque to offer to the Benevolent Association. It was a proper ideal that the industry should look after its own unfortunates, and this could be accomplished better if each section were responsible for its own quota.

He regretted that the superannuation scheme drawn up by Mr. Parkinson had not been proceeded with, and suggested that a guarantee fund would make it possible for small firms to provide for their employees at a reasonable cost. It was along these lines that they would ultimately relieve the work of the E.I.B.A. Referring to their collection for the Association, he said that this effort had been started at the instigation of Mr. E. E. Sharp. The council had drawn from its funds to make the total up to a round sum of £500.

The principal guest at the dinner was Sir Alexander Swan, D.L., LL.D., former Lord Provost of Glasgow, who, in proposing the toast of "The Electrical Wholesalers' Federation," mentioned that this year it was celebrating the twenty-fifth anniversary of its formation. He was associated with other trades as well as having a little link with the electrical, and in some they were forgetting the true functions of the wholesalers, who were becoming just agents of the manufacturers. That was altogether wrong. The growth of the electrical industry very largely depended first on the manufacturer producing the articles and secondly on the judgment of the wholesalers in selecting those that would be appreciated and would become selling propositions.

Referring to the proposed Distribution Bill he said that he thought they need have no doubt that the Government would bring in a Bill to co-ordinate the industry and he believed that they would not be antagonistic, but it was unfair that the industry should be penalised by not being told what was proposed. He thought the Government should consult with them.

In responding, Mr. Yuille mentioned that there were present a number of founder-members and past-presidents, whom he congratulated on their foresight. He said it was doubly true to-day that it was not sufficient to organise one's own section of the industry; each must collaborate with the others and be strong enough to enforce the carrying out of its principles.

Their Federation had unstintingly lent its services to find solutions of the many problems confronting the industry and it was a pity that there were so many firms unacquainted with these efforts. He suggested this not for the purpose of augmenting the number of members but rather he had in mind that so often their joint work was frustrated because the responsible manufacturers felt unable to give effect to their desires on account of the activities of competitors. It was a matter on which they might put their heads together with great advantage. His Federation would give its full support to spreading the idea that there was security in organised trading.

Mr. A. B. Wildsmith, past president, proposing the toast of "Kindred Associations," said he was a great believer in association work, and could see no reason for any firm remaining aloof. He knew of the selfish reason "We believe in running our own show," but such firms were in reality obtaining the benefits of association work while subject to no form of control. He thought it was obvious to all that the Government was vitally interested in the control of its great industries. During the past twelve months the E.W.F. had had a number of meetings with other associations. Many difficulties had been overcome, and the feeling existing to-day was better than ever before.

Responses were made by Mr. W. Moir, chairman of the Electric Lamp Manufacturers' Association, and Mr. T. G. Spencer, chairman of the Cable Makers' Association. Mr. Spencer deputised for Mr. W. Riggs, president of the Electrical Contractors' Association, who was absent through illness. Speaking of the value of such associations to the country, he said that they were being told that industry must get together to look after the export trade, which was the life-blood of the country. The toast of "Our President" was proposed by Mr. W. R. Gledson, vice-president.

During the dinner a collection was made on behalf of the E.I.B.A., amounting to £33.

Penetration of Bombs

MEMORANDUM No. 2 of the Engineering Precautions (Air Raid) Committee of the Institution of Civil Engineers deals with the penetration of bombs. This is shown with the aid of diagrams to depend largely on the sectional density (ratio of weight to maximum cross-sectional area) of a bomb. Since the steel case has a much higher density than its high-explosive filling, the sectional density depends on the charge/weight ratio, or the proportion of the weight of explosive to the total weight.

Penetrative power depends on arrival velocity, which for a very heavy bomb of high sectional density is probably about 1,200 ft. per sec. and for an incendiary bomb of low sectional density 400 ft. per sec.

An incendiary bomb with a sectional density of ½ lb. per sq. in. and an arrival velocity of 400 ft. per sec. would penetrate concrete (of medium strength) to a depth of about 1 in., and sand, gravel or earth to about 1 ft. A 500-lb. bomb with a charge/weight ratio of 40 per cent. or a 2,000-lb. demolition bomb with a charge/weight ratio of 55 per cent. might be expected to have a maximum depth of penetration of 2 ft. 6 in. in concrete and of a little over 20 ft. in sand or gravel.

The vertical depth into the ground reached by a 2,000-lb. bomb of high sectional density designed for good penetration (containing only a small proportion of high-explosive) is unlikely to exceed 60 ft., without allowance for the disruptive effect of the explosion.

Copies of this memorandum can be purchased from William Clowes and Sons, Ltd., 94, Jermyn Street, S.W.1, at 6d., post free.

MEETINGS AND DISCUSSIONS

Are the Commissioners' Powers Adequate? Boiler-house Maintenance Problems. Kiln Costs

That the Electricity Commissioners had the confidence of the industry and should be given a freer hand was the view expressed by Mr. J. C. Dalton in a lecture to the A.S.E.E. on Tuesday. Two recent papers abstracted in this section relate to the boiler-house, one dealing with the six large steam boilers at the Dalmarnock power station and the other with maintenance costs and problems. In a paper to the Institute of Fuel last night it was stated that apart from working costs electric kilns appeared to offer better possibilities from every point of view than other systems of firing.

The Commissioners' Functions

THE exercise of the powers of the Electricity Commissioners in relation to public electricity supply authorities was commented on in a lecture which Mr. John C. Dalton (manager and secretary of the County of London Electric Supply Co., Ltd.) delivered before the ASSOCIATION OF SUPERVISING ELECTRICAL ENGINEERS in London on March 21st.

Emphasis was placed on the function of promoting the supply of electricity, which was dealt with at length, the lecturer advancing the opinion that this function had become subsidiary to administration.

To find out how the Commissioners exercised their functions it would be necessary to study seven Acts of Parliament, refer to various Special Orders and numerous Regulations made by them; as well as hundreds of decisions recorded on various problems submitted to them. In addition, since 1919 recourse had been had to the High Courts for interpretation in some forty cases. In short, said Mr. Dalton, one could stamp across the Acts the words "for particulars see small handbills."

The Commissioners must not exceed five in number; at present there were three and the lecturer mentioned several reasons why they were not deemed to constitute a Government Department, or their staff to be civil servants, although they were subject to the same general conditions of service.

That early decision, in Mr. Dalton's view, did not augur well either for the staff of the Commissioners or for the industry. The statutory duty of "promoting" the supply of electricity in the whole country could only be fulfilled by obtaining the services of the best men available at salaries commensurate with those paid in the industry itself; salaries which did not come out of public funds but from the industry, and which, the lecturer was perfectly certain, the industry would be glad to bear. It was a source of wonderment to him how cheaply and yet how efficiently the Commissioners functioned, in spite of the handicap of this civil service idea, but, said Mr. Dalton, he was entitled to the opinion that the function of "promoting" the supply of electricity might have suffered, or would suffer, by reason of this factor.

Promotion Work the Main Duty

Apart from "promoting" the supply of electricity, there was really no other material reason for the setting up of the Commissioners. The other functions of regulating and supervising supply were proper to a Government Department and there used not to be criticism of the administration of the old Electric Lighting Acts by one or two principals and a few clerks in the Board of Trade. Those functions could to-day be administered quite expertly by a branch of the Ministry of Transport, because for administration pure and simple there was nobody in the world (including the business world) like the British civil servant.

For the very different function of promoting the supply had the Commissioners been furnished by Parliament with adequate powers? In preparing schemes for determining selected stations and for providing the grid, no body other than the Commissioners could have faced such a task. If they had had a publicity department they might have got their proper meed of credit for so splendid a work of nation-wide importance.

There was no question that that was promotion work of the first order, but in connection with the other functions Parliament had not been so explicit and all sorts of circumstances had militated against the promotion of supply in other ways. For example, attempts to set up Joint Electricity Authorities were not very successful. The root of the trouble was the non-recognition of the fact that it was not possible to run an electricity supply business by an authority comprising representatives of county councils, local councils, railway companies, workers in the industry and so on. It was the only sound argument Mr. Dalton said he knew against democratic control.

The Commissioners could require two or more authorised undertakers in an area to enter into arrangements for mutual assistance, but that power had not been taken advantage of as it might have been. A legal difficulty had arisen in this connection, but had early action been taken, or some similar provision been obtained, Mr. Dalton said he had no doubt that much of the dissatisfaction now expressed about the distribution side of the industry would not have arisen. In short, he held that the Commissioners and the industry had missed an opportunity in not taking action on the lines of Section 19 of the Electricity (Supply) Act, 1919.

Year after year Special Orders authorising a supply of electricity in certain areas had been granted. He had heard it said that it was difficult to understand why the Commissioners sanctioned powers for small areas of supply, even during recent years, when, on the other hand, they were urging the need for large and diversified areas for distribution purposes. The answer was that the Commissioners had no option but to grant those powers under the legislation as it stood at present, apart from the fact that, like all sections of the industry, this function had been dictated to a large extent by the remarkable and natural growth of the industry itself.

Owing to legal difficulties, coupled with a certain degree of nervousness on the part of the Commissioners themselves, the promotion of supply on its retail side had gone ahead by its own impetus, and that impetus had outstripped any direction which the Commissioners were able to give to it. Regarding administrative functions, it was difficult to know where regulation ended and supervision began. The powers of making regulations were exercised with scrupulous fairness and with great ability, but the weight and responsibility of these functions alone had assisted to put into the background the less defined but vitally important function of "promoting" supply.

Tackling Problems on the Spot

The Commissioners should leave to their excellent officers more of the task of regulating and supervising and get out into the industry and inspect personally the major problems which arose every day with those who were trying to make electricity available everywhere as cheaply as possible. Those problems were not unknown to the Commissioners, but the realisation of them would, with close contact "in the field," be a matter of days only as contrasted with months of correspondence, exchange of plans, deputations, &c. A large and qualified body of engineering inspectors could advise the Commissioners at first hand just what was happening in the industry.

The Commissioners would find that the supply business on the distribution side was incapable of being run by district boards, or joint authorities, or any other conglomeration of oddities. Local patriotism was something to encourage rather than subdue; to endeavour to improve distribution by compulsory acquisition of one undertaking by another might result in dis-service both to the undertakings and the industry. They would find—perhaps surprisingly—that municipal and company undertakings could and did work side by side in a co-operative way, and that the spirit of co-operation could be extended to one undertaking managing or leasing the other undertaking to the benefit of both, whereas the idea of "compulsory acquisition" between the two same undertakings would lead to civil war.

All this was an endeavour to say in another way that Parliament should give the Commissioners a freer hand in promoting supply. The Commissioners had the confidence of the industry. They had built up a credit which was invaluable to the Government. The Commissioners should be allowed to lead the industry by just one step faster than it was travelling by its own impetus.

Dalmarnock Boiler Plant

SIX steam boilers installed at the Dalmarnock power station of the Glasgow Corporation during 1936-37 were described in a paper by Mr. W. E. Young (Yarrow & Co., Ltd.), read at the INSTITUTION OF MECHANICAL ENGINEERS in London yesterday (March 23rd).

They were, the author stated, of the Yarrow water tube type, each capable of evaporating 230,000 lb. per hour continuously at 625 lb. per sq. in. and superheated to 850 deg. F. with automatic interstage control of the temperature of the steam.

Interposed between the primary and secondary superheaters was a surface type desuperheater. Steam passed through the

interior of its tubes and on the outside of the tubes boiler water was maintained by means of a down-pipe from the boiler steam drum, steam generated passing to the boiler through an up-pipe.

Two butterfly valves in the steam connections, one in the desuperheater by-pass pipe and the other in the pipe leading to the desuperheater, controlled the proportion of steam passing through the desuperheater, or through the by-pass. The action of these valves was determined by the steam temperature at the exit from the secondary superheater by means of a thermometer connected by a capillary tube to a spiral Bourdon tube, the whole being filled with mercury under high pressure.

The Bourdon tube operated a controller comprising two separate electrical contacts, which in turn energised reversing contactors controlling an electric motor which operated the butterfly valves through gearing so arranged that when one valve opened the other closed. A handwheel was also fitted to this gearing for direct manual operation, with switches for manual control of the motor at the instrument panel.

These boilers were described as the largest in Scotland and their bunkers, each of 200 tons capacity, as among the first in this country of such dimensions to be of welded construction. The "archless" combustion chambers were quite stable at evaporation rates as low as 8,000 lb. per hour. All four walls were water cooled by Bailey tubes and the gases passed through the Foster economisers upward, counter flow being maintained by passing the water through the upper rows of tubes before it entered the lower.

The Howden-Ljungström air preheaters operated in parallel pairs and the Babcock & Wilcox twin stokers were of the forced draught compartmented type. Scroll type dust collectors were fitted and both forced and induced draught fans were driven by two-speed motors with Tate electrically operated torque devices for controlling the vanes, actuated by push buttons from the instrument panels.

The coal conveyors were electrically interlocked to ensure automatic starting and stopping in sequence, with push-buttons at intervals along their lengths for quick stopping. All the motors in the boiler house were started direct on the line and developed their full rated outputs at any voltage between 440 and 300 V and at any frequency between 50 and 45 cycles. There were 69 motors of from 175 to 2.5 BHP in addition to 24 motors (0.25-HP each) for the draught vanes.

The paper concluded with tabulated test results, fuel consumption curves and operating notes and observations.

Kiln Fuel Comparisons

FACTORS that influence the choice of fuels and kilns in the ceramic industries were surveyed from the economic and engineering standpoints in a paper by Mr. John Fox read before the INSTITUTE OF FUEL in London yesterday.

The paper was based on the manufacture of a fairly wide range of products at the works with which the author is associated. After a synopsis of the firing principle, several kinds of kiln were described, with particular reference to the tunnel type which the author said was now well established for various sorts of ware, including electrical porcelain.

Electric kilns were not used in the heavy clay industry, their use being chiefly confined to the decorated china trade, but electric power was employed for driving kiln auxiliaries, such as draught fans, coal grinders, stokers, &c.

In comparing the relative merits of fuels the author quoted gross costs inclusive of capital charges, labour, handling, power, &c., of 1.1d. to 1.6d. for coal, 1.45d. to 1.8d. for hot producer gas (coke), 1.8d. to 2.2d. for clean producer gas (coke), 2.5d. to 4d. for town gas, 2.75d. to 3d. for oil and a net cost of 7d. to 10.5d. for electricity, per therm in each case.

The author declared that the economics of electric firing still required to be proved, at any rate so far as this country was concerned. Electricity at approximately 10d. per therm was giving very satisfactory results with decorating kilns in North Staffordshire, and reports, both from the Continent and the United States, showed that biscuit and glost firing by this method were both commercially possible.

Even assuming that the thermal efficiency of an electric kiln was double that of any other type, the cost of heating was likely to be more than that obtained when burning town gas. Apart from the consideration of working costs an electric kiln appeared to offer better possibilities from every point of view than those likely to be achieved with any other system of firing. There were no technical difficulties in reaching such temperatures as were normally required in the tile trade.

In the case of the Woodall Duckham circular tunnel kiln, the ware (instead of passing through on cars) was carried on a circular tray revolving at from 1.5 to 3 ft. per hour according to the nature of the ware being fired.

Although circular kilns were popular in America and several small "Rotolec" electric kilns had been erected recently in England for the decorated china trade, the various Woodall Duckham installations were distinctive both as regarded construction and operation, without particular resemblance to any other design. The first kiln of this kind was built about ten years ago for the Southook Potteries, near Kilmarnock, and a second plant had since been erected at the same works. Further kilns of the same general design had also been installed at the works of Messrs. Shanks at Barrhead, for Messrs. Doulton at their Burslem works, as well as for other manufacturers. Some of them were firing insulators entirely satisfactorily.

The mean circumference of the tray was 250 ft. Two diametrically opposite pinions engaging with the rack were driven electrically either through a countershaft system or by a train of wheels and variable-speed gear. About 15 HP was required, including the waste gas and secondary air fans. Duplicate motors were provided as a safeguard and they were housed at the hub of the circular kiln with the fans and chimney. These kilns were of the semi-muffle type, fired with hot producer gas.

Boiler-house Maintenance

COSTS and problems in boiler-house maintenance, with epidiascope illustrations, were dealt with by Mr. A. Hale at the South Wales branch of the ASSOCIATION OF MINING ELECTRICAL ENGINEERS at Cardiff on March 11th. The author confined himself to the mechanical rather than the electrical side of the subject.

The smallest detail should be observed, he said, no matter how insignificant it might appear. Feed water containing injurious matter could be responsible for heavy maintenance costs, causing the boilers to be taken off the line far too frequently for descaling, while the effect of acids on boiler plates, non-ferrous valves and fittings, eating away the metal, caused serious leakages, plus the cost of repairs and renewals. Continual observation of fan casing, flue system and economiser for air leakage or obstruction to air flow or erosion was necessary. The cleaning, both internal and external, of economiser tubes to ensure maximum heat absorption, which raised efficiency and reduced fuel costs, was equally important.

Leaky joints and packings presented another frequently unobserved cause of heavy boiler-house cost. Correct alignment of shafting with self-aligning ring bearings was also an essential. These would, however, run for long periods with little attention. Turbine pumps must be opened up periodically, especially if handling hot water, as they soon lost their efficiency. Other factors which assisted costing were the periodic and proper cleaning and testing of motors, switch and control gear, and checking for overload or adverse conditions. The choice of staff was vital.

University College, London

THE annual report of the Committee of University College, University of London, for the year ended February, 1939, shows that the number of students last session was 3,160 who came from fifty-five countries. There were 567 post-graduate and research students, while the College has for many years been actively promoting adult education by providing free public lectures; the aggregate attendance at these during the 1937-38 session was 15,700.

Prof. R. O. Kapp, Dean of the Faculty of Engineering and Pender Professor and Director of the electrical laboratories, presents a long list of researches, many of which are being conducted with the assistance of industry. Work has been continued on the development of a protective device for the automatic disconnection on short circuit of electric-discharge tubes as used for lighting and advertising signs, and the cause of noise produced by transformers, the latter with the aid of E.R.A., which is also aiding a new research of the calibration of piezo crystals.

There is also research on the design and performance of telephone receivers, on the characteristics of short-wave oscillation and field strength measurements, and on the investigation of non-linear circuit characteristics by means of a differential analyser, the last two being carried out for the Department of Scientific and Industrial Research and the Post Office.

The electrical engineering equipment has been helped materially by the fund established in 1937 by Miss Mary Clinton in memory of her brother, the late Prof. Wellesley Curram Clinton, Prof. Kapp's predecessor in the Pender Chair. The most important recent purchase is a grid controlled mercury arc rectifier.

The association of Prof. Emeritus J. T. MacGregor-Morris with the staff as an honorary research associate in electrical engineering is referred to in the report. The Senate has conferred the title of University Reader in Electrical Engineering upon Dr. H. E. M. Barlow, sub-Dean of the Faculty of Engineering and formerly senior lecturer in electro-communications, who has also rendered service to the College community in all matters pertaining to the subject of good lighting.

CORRESPONDENCE

Every letter must be accompanied by the writer's name and address preferably, but not necessarily, for publication. The Editors cannot accept responsibility for correspondents' opinions

Electricity and Acoustics

WITH reference to the review of my book "The Amplification and Distribution of Sound" in your issue of March 10th, I trust that it is not out of place for me to seek further enlightenment.

I welcome any constructive criticism, but your review mystifies me, for although I certainly appear to have broken some holy laws, a careful study of your reviewer's comments does not help me to avoid such misdemeanours in future.

No specific fault is found with the work except that I attempted too much, and also that I sought to teach electrical engineering through the medium of acoustics—surely a somewhat difficult proposition. No attempt was made to illustrate these points by references to the text.

In view of the satisfactory reviews which have appeared in other journals, I find it difficult to understand your reviewer's conclusions and I feel that there is a possibility that he has not appreciated the purpose of the book or the type of reader for which it was intended.

Kenton, Middlesex, *March 16th.* A. E. GREENLEES.

[Our reviewer assures us that he did not wish to be hard upon the book. He considers, as he said in his review, that it contains much useful information on the subject, but that too much extraneous matter, easily obtainable from existing works, is included, adding unnecessarily to the cost. He stresses that his criticism was made in the light of the particular requirements of readers of the ELECTRICAL REVIEW—men who already possess the necessary electrical knowledge and are desirous of obtaining acoustical information.—EDS. ELEC. REV.]

A.R.P. Problems

Owing to the extreme measures to which it has been necessary to carry the protection of property and personnel against raiding aircraft, it may be deemed advisable in the very near future to redesign methods of illumination and ventilation in certain buildings.

Where plant is used for a key industry steps have been taken to dispense with natural illumination, *i.e.*, glass windows, owing to the damaging effect of blast and splinters. The result is for artificial illumination to be resorted to in some instances for twenty-four hours per day, while ventilation must be tackled on an all-the-year-round basis, providing an even temperature throughout. As some of the places concerned are comparatively small buildings, but nevertheless are regularly inhabited, the requirements do not call for an elaborate arrangement, but one of simplicity and effectiveness at minimum cost.

Heating and ventilation must go together to form one system, that of air conditioning, not locally, but generally throughout the building or room irrespective of floor space.

These items therefore call for investigation by experts in what is now considered to be a specialised branch of engineering.

A deterrent to the adoption of such a procedure is undoubtedly initial cost, but suitable apparatus properly installed must pay for itself in a very short period against any haphazard method employed.

Enfield, *March 15th.* R. R. BELBIN.

"Rules and Registration"

It is satisfactory to observe the publicity given to the above subject from time to time in the ELECTRICAL REVIEW and the remarks and observations contained in the leading article in your issue of March 17th are to the point.

It is truly stated in this article "There is no control beyond the connecting-up requirements of the supply authorities and the rather elastic regulations of the Electricity Commissioners. Apart from this, it is nobody's job to see that installations are sound and safe." In other words, it would seem that the Government is concerned about men and women in factories but what happens to those same men and women in their homes is nobody's concern, except, perhaps, that of reputable electrical contractors.

It is quite possible that voluntarily registered contractors are not all above reproach and the system of voluntary registration has not achieved anything worth while, notwithstanding that the Register has been in existence fifteen years. I could cite many cases to prove the foregoing statement, but perhaps the following will suffice:—

My firm was recently asked to give a report on an installation which was in a disgraceful condition and when submitting our report we also stated that the approximate cost of bringing the installation in line with the regulations would be a certain figure. Judge of our surprise when we were informed that a firm of registered contractors had offered to carry out the work for exactly half our figure and on making investigations we found that they had purposely excluded a number of essential items. We were asked to proceed with the work at the other firm's price but of course had to turn it down.

I do not disbelieve that the Register has been a considerable influence for good, but the position should be quite clear when it is known that at March, 1938, out of a number of ten or twelve thousand who were carrying on as contractors only 1,723 were registered. There is also no doubt of the fact that reputable registered contractors lose a great deal of business to the hordes of scallywags in the industry simply because they refuse to carry out work which is contrary to the regulations.

It is a most unsatisfactory state of affairs to say the least of it and as the Register appears to be doing little to alter the situation I wish the A.S.E.E. good luck in its real efforts towards the goal of compulsion.

Glasgow, *March 18th.* ALEX. MILNE.

I read your leading article in yesterday's issue with amazement, doubtless shared by many of your readers. I am amazed, first, at the nature of the statements made by Mr. Townley, and secondly, at the blind unquestioning faith with which you appear to accept them, despite their glaring inconsistencies.

First, he states that the supply authorities are unwilling to shoulder the costs involved, while later he states that two full-time inspectors would be sufficient in a town of half a million people. In other words, a supply authority having an annual revenue exceeding a million pounds per annum cannot afford to pay the salaries of two electrical installation inspectors.

As a matter of principle, it may be argued that a supply authority running its own contracting department (and there are many) should not be empowered to be the judge of its competitors' work and to inflict heavy penalties upon them, but from the financial standpoint it must surely be obvious that in a town of half a million inhabitants the salaries of twenty installation inspectors would be a mere flea-bite to the supply authority.

And herein is where I join issue with you also, for I submit that twenty installation inspectors and not two is the number required in such a town. Whether they would constitute a "horde" is, of course, a matter of opinion. You state: "After all, installations, even in the largest towns, do not go in at the rate of hundreds a day," but that is precisely what does happen, or at any rate should happen, for according to the McGowan Report the largest supply authorities are the most active in electrical development.

In a town of half a million inhabitants the supply authority should be connecting up an average of fifty lighting installations per working day, twenty-five cooking installations, fifty heating installations, twenty-five water-heating installations, and twenty-five washboiler installations, to say nothing of motor installations, a total of nearly two hundred installations. Can it seriously be contended that these installations can all be adequately inspected and tested by two installation inspectors It is true that my figures for the number of installations are intended to include extensions for existing installations, but as an extension should be tested and inspected just as carefully as an original installation, this point makes little difference.

I submit that installation inspection under such circumstances would simply be a farce and your statement that "the others would be forced to be careful lest they should lose their licences and livelihood" would simply be a travesty of the facts. On the contrary, the chances would be a hundred to one against shoddy workmanship being discovered, and the jerry contractor who lost his licence would merely be unlucky.

In conclusion, I would stress that the object of this letter is not to push the case for compulsory rules and registration, though I am strongly in favour of them, but to urge the neces-

sity of presenting it in accordance with the facts, and not by means of wild statements which will not bear a moment's investigation.

D. P. BECKETT.

Exeter, *March 18th.*

We sent Mr. Townley a copy of Mr. Beckett's letter and he replies as follows:—

Mr. Beckett's letter raises two main points: (a) as to whether the electricity supply undertaking should be responsible for the inspection of wiring installations in order to ensure that the work and material used complies with an approved minimum standard, and (b) the order of the number of inspectors required to carry out the work satisfactorily.

I think it is necessary to stress that no scheme of compulsory registration of contractors and compliance with a statutory wiring code will have any prospect of Parliamentary approval if it imposes any material additional costs on the consumer, and it is immaterial whether this cost is borne by the supply undertaking or by another body, the cost must ultimately be borne by the consumer.

Supply undertakings are required, under the Electricity Supply Regulations (see Regulations Nos. 26 and 27), to carry out certain tests and inspections before connecting an installation to their mains and this statutory inspection and test would presumably still remain. It can be shown, however, that a very bad installation can comply with these Regulations, and the main reason for the present proposals is to supplement them with a scheme which will provide greater safety for the purchaser.

The large majority of electricity supply authorities consider that the tests and inspections required under the existing regulations should be the limit of their responsibilities and that they should not be required to act as clerks of the works on installation work generally. Mr. Beckett has himself pointed out the anomaly of undertakings inspecting and approving work carried out by their own installation departments, and this is an additional reason why a statutory inspection as to standard of workmanship and materials should be the business of an independent body.

West Ham happens to be an undertaking which has statutory wiring by-laws, and our experience has made it perfectly clear that it is quite unnecessary for an inspector to sit on the work of a reputable contractor during construction; an occasional inspection whilst installation work is actually going on is sufficient. Contractors who carry out shoddy work, even under present circumstances, soon become known and their work can be more closely supervised. A few cases of refusal to accept such work soon cures any tendency on the part of these gentlemen to involve themselves in the additional costs incurred by replacements. Therefore, my suggestion of two inspectors in a town of half a million inhabitants examining installation work during actual construction is not unreasonable, and is based on experience.

The figures given by Mr. Beckett as to the number of installations which would be connected up daily in a town of half a million inhabitants is much beyond anything of which I have any knowledge.

There is a considerable amount of experience in other fields of operating a scheme of this kind. I would mention only two: the inspections carried out under the Factories Acts, and the check testing of electricity meters before certification. It is found that compliance with the requirements in both these cases can be effected with a relatively small number of inspectors and at relatively small cost.

West Ham, *March 21st.* J. W. J. TOWNLEY,
Engineer and Manager, Electricity Department.

In the Courts

Neon Sign Dispute

IN the King's Bench Division on March 17th Lord Justice Finlay had before him an action by Stuart Vernon, Ltd., printers, London, E.C., against Electrolumination, Ltd., London, N., to recover damages for alleged misrepresentation which induced plaintiffs to enter into a contract in respect to the installation of a neon electric advertising sign.

Plaintiffs alleged that the defendants through their representative wrongfully represented that the installation cost would be the only cost, and that the maximum cost of maintaining the sign would be 2s. 6d. a week, whereas the electricity bill for about seven weeks for the maintenance was £6 10s. 6d. The cost of the installation was £156 12s. A railway company objected that the sign caused trouble with its signals and alterations were made which caused the advertisement to be practically useless.

The defendants denied that their representative had made the representations alleged.

After hearing the evidence Lord Justice Finlay found that there had been no serious misrepresentation on the part of the defendants, in whose favour he gave judgment with costs.

Here and There

By Nomad

SINCE last Friday I have had a chance to see a few of the more important electrical contractors to find out what they think of the latest developments relating to the introduction of compulsory registration. The subject is a very much more complex one than it might appear at first glance and everyone I spoke to touched on some new and often unexpected aspect. In general, however, I came to the conclusion that while the desirability of the step is more or less unquestioned there are very grave doubts as to the practicability of enforcing the desired conditions.

* * *

Education of the public to employ only registered contractors appears to some to be the only solution of the problem. This happy state of affairs will no doubt come to pass one day but the process is slow and fraught with difficulties. In this connection I was particularly interested to hear what Mr. Colin R. Bates, managing director of Electrical Installations, Ltd., had to say. He deplores the introduction of any more regulations but he is at a loss for an alternative unless it is the setting up of a very big advertising fund to educate the public. But where is the money to come from?

* * *

Mr. Bates thinks that for various reasons it is impossible to give the supply authorities powers to decide what is or is not a satisfactory installation. The pivot of the whole scheme, he considers, is the issue by the contractor of a certificate of soundness based on a comprehensive system of standardised tests, another essential being some regular maintenance test of efficiency. He goes even a step further and suggests that a contractor should be made to subscribe to an indemnity fund and that, if and when registration is made compulsory and so virtually establishes a monopoly, the fee to be paid by contractors should be a big one for the privilege of carrying on their business under such sheltered conditions.

* * *

As things are at the moment, Mr. Bates says, if a wireman is out of work for a fortnight he often tries his luck as "contractor," and if he gets a succession of small jobs everything may be satisfactory, but if he falls short of work or if he gets too much, he has no capital to cope with the situation. His work need not be carried out to any standard of quality, and he has neither money nor reputation to lose. While customers of this class of "contractor" may tell you that they are acting out of compassion and sympathy, it is usually found that the fundamental reason is cheapness.

* * *

Another opinion is that compulsory registration is impossible until there is an agreed national wiring code and penalties are imposed upon anyone responsible for an unsafe installation resulting in injury or damage to persons or property. The holder of this view also considers that the responsibilty for approving an installation should not rest with the supply authority since the class of engineer employed is often not competent to supervise, often ignorant of wiring rules and not too particular about what is connected up. Furthermore if the responsibility for approval were in the hands of the supply undertakings an additional cost would fall on them and thus tend to increase the price of electricity. If a national wiring code were introduced, far from needing two inspectors for each town, a dozen would be sufficient for the whole country. Besides being the method most likely to bring success, it would also be the cheapest, for while Parliament would probably refuse to sanction compulsory registration it would penalise persons infringing the code.

* * *

Rather a different point of view is taken by Mr. G. H. Robinson, joint managing director of T. Clarke & Co., Ltd., who I was glad to see looking so much better after his recent illness. The use of poor materials rather than poor workmanship he considers to be the crux of the matter and in this respect he holds that some wiring contractors are not altogether blameless and are liable to succumb to temptation just for the sake of making a few extra pounds. He thinks that materials should be purchased only from members of recognised manufacturing organisations. These associations stand for safety and quality based on years of research. Mr. Robinson has a high opinion of the competency of the men generally employed in installation work and claims that if properly supervised they are quite capable of carrying out their jobs efficiently. He particularly points out, however, that good workmen cannot achieve good and safe results in an installation with cheap and inferior materials. The whole question, he says, needs to be reviewed by all the authorities concerned.

NEW ELECTRICAL PRODUCTS

A review of equipment recently marketed

A Heating Pad for Motor Cars

TO the existing range of the "Permaheat" heating pads made by PERMAVOX, LTD., 11, Friday Street, Manchester, 4, has been added one specially designed for operation off a 12-V motor-car battery. It measures 17 in. by 12 in. and can be sat upon, placed behind the back or it can be used as a hand or foot warmer.

There is a choice of three temperatures and at 110 deg. F.

"Permaheat" heating pad

the current rating is 1¼ A. In view of its battery operation the pad is suitable for use in A.R.P. shelters. As in the case of all "Permaheat" pads, the element is asbestos covered in a fireproof inner blanket, enclosed in turn by a fleecy outer blanket, washable cover and waterproof cover to make it strong both mechanically and electrically.

Rotary Milling Shapes

A complete range of British-made rotary milling shapes for use on flexible shafts is now available from F. GILMAN (B.S.T.), LTD., 193 and 195, High Street, Smethwick. They are very suitable for finishing off dies and also for aeroplane work. They are claimed to have a 50 per cent. greater life than foreign products of a similar kind when used on aluminium alloys.

Arcing Contacts for Switchgear

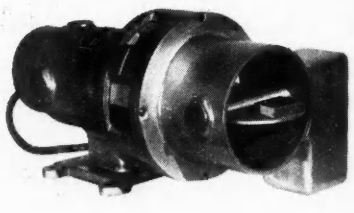
About two years ago EDGAR ALLEN & CO., LTD., Imperial Steel Works, Sheffield, 9, introduced a new material for arcing contacts which proved successful in various works manufacturing electrical switchgear. This special alloy is made in an electric high frequency crucible furnace, and is specially designed for the tips of contacts in high-voltage switchgear where burning by the arc has caused short life.

It is now possible to draw the alloy into simple shapes, but it cannot be obtained in extruded sections. It can be either forged or cast, and could probably be drop forged, though this would not be easy. The resistivity of the material is about three-and-a-half times that of copper. The material is readily machineable, and has a Brinell hardness of 240.

It can be brazed on to mild steel in exactly the same way as high-speed steel. It cannot be welded, and its chief virtue lies in the fact that it will not oxidise and burn as easily as copper.

Code Signalling Electric Syren

An automatic shutter device is fitted to the new code signalling syren of the SERVICE ELECTRIC CO., LTD., 122, Pratt Street, London, N.W.1.



Service Electric Co. syren fitted with the automatic shutter device

The sound emitted by syrens of the rotary type results in a long drawn-out wail when the current is cut off. The usual method of overcoming this is to use dynamic braking.

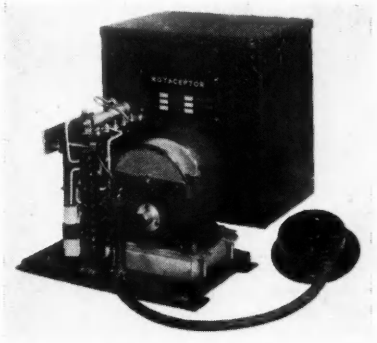
The Service Electric Co.'s automatic shutter, however, is operated simultaneously with the syren motor by the same switch that controls the latter. With this automatic shutter it is claimed that definite cut-off can be obtained with great rapidity of operation, so that it is possible to send code signals at a reasonably fast rate. The control is simpler and more positive than with dynamic braking.

Producing AC from Batteries

It is claimed by TECHNICAL INVENTIONS, LTD., Terminal House, Grosvenor Gardens, London, S.W.1, that the latest "Rotaceptor," a development of that introduced in April, 1937, will convert into a good commercial sine wave the output current from an ordinary accumulator—in fact, by modifying the design, any form of sine wave can be produced.

The equipment is particularly suitable for lighting neon signs on motor vehicles directly from accumulators. It comprises a special "motor" and transformer. Instead of an armature winding there is a laminated iron flywheel revolving within the field of an electro-magnet, the field coil of which is connected in series with a commutator and slip-ring. To minimise flashing in the sign due to brush bounce two brushes are provided in parallel.

Interrupted DC is produced from the commutator and the frequency is changed both by varying the number of commutator segments in designing the motor and by speed variation of the timed motor on site, so that any frequency of from 800 to 3,000 cycles per sec. can be obtained.



The "Rotaceptor"

The primary of the transformer is in direct parallel with the field of the motor, but in the new model the wave form is varied by the size of the reversible electrolytic condenser across the windings. For a normal sine wave the value is 500 μF, the condensers serving to provide and absorb current at the points of make and break of the commutator segments.

There are a number of tappings on the transformer, and a variable resistance gives a vernier control to each. A spark gap is provided in case of tube breakage.

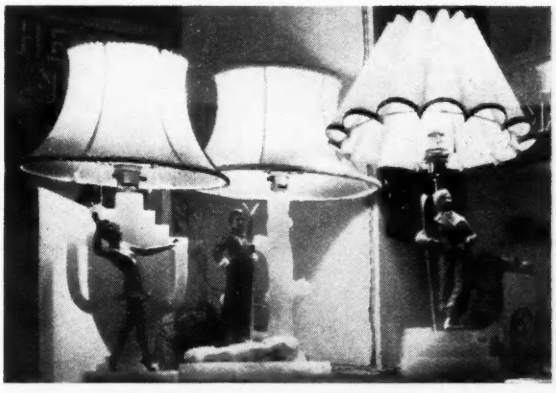
The "Rotaceptor" can be provided with a transformer wound for 5,000 V or 10,000 V (striking) for tubing lengths of 20-25 and 40-45 ft., respectively. Good lighting can be obtained by taking only 2½ to 3½ A from the battery, while by altering the wiring slightly the current can be reduced to about 1 A for lighting a small sign.

As the motor is not normally self-starting a special three-position switch is used so that control may be effected remotely, as, for instance, from the dashboard of a motor van when illuminating a sign at the rear.

Medical Lamp

The "Sunbrite Duplex" is a new health lamp which has been added to the range obtainable from ELECTRICAL UTILITIES, LTD., 9, St. Cross Street, Hatton Garden, London, E.C.1.

The lamp is a table model and comprises an infra-red heat generator behind a carbon arc ultra-violet source. In the new type a switch is incorporated to cut out the arc so that only infra-red rays are emitted.



Group of new alabaster lighting fittings made by British Alabaster and Arts Co., Ltd., Weston, near Stafford

A Fan Heater

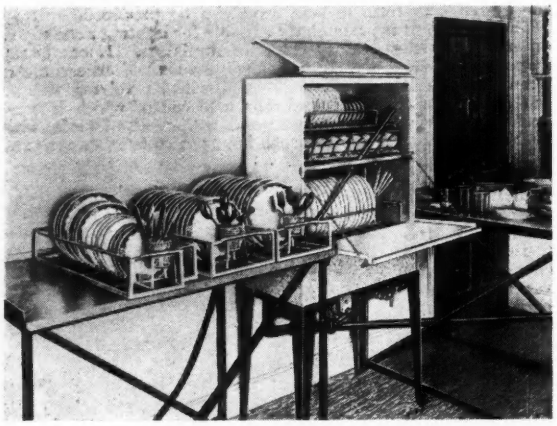
The "Fragrantair" is a fan heater mounted on a pedestal to give adjustability for height and angle and fitted with a special deodorising or perfuming attachment in front of the guard. A switch enables either hot or cold air to be obtained. Cream, green, pink and blue are the usual finishes. It is British made, and is sold by the LONDON COMMERCIAL ELECTRICAL STORES, 13, Farringdon Avenue, London, E.C.4.

D

Dish-washing Machine

The "Niagara" dish-washing machine of SMITH'S (DISHWASHERS), LTD., Niagara Works, Lower Richmond Road, Mortlake, S.W.14, is housed in a white-enamelled metal cabinet with chromium fittings measuring 30 in. high by 30 in. wide by 15 in. deep.

Two parallel sprays of water, front and back, are ejected



"Niagara" dish-washing machine

with force from revolving arms and an 1,800-W element heats the 2½-gal. water sump. After two or three minutes of washing a tap is turned to drain the sump and admit the rinsing water. The dishes are then left in the racks, drying being accelerated by switching on the heater.

The unit can either be mounted on legs or fixed to a wall or shelf.

Offset Surface Mounting Fires

A new range of welded steel offset surface mounting electric fires has recently been introduced by GRAHAM FARISH, LTD., Bromley. They are constructed of welded steel and finished in oxidised copper, silver or a crystalline stoved finish with either aluminium or chromium plated reflectors.

Graham Farish offset fire

The fire may be fitted direct on a wall by simply removing the reflector and fixing by ordinary wood screws. When fitted it gives a built-in effect due to the shallow slope of the frame.

A number of different models is available, with either vertically or horizontally mounted elements, in 1- and 2-kW loadings.

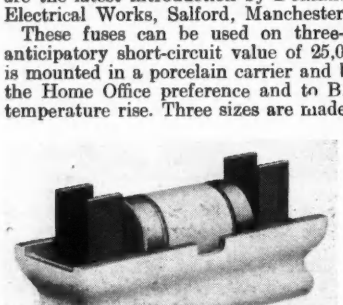
Portable Generating Sets

In view of the dislocation in electricity supply which might be caused by air raids, BLACKSTONE & CO., LTD., Stamford, are adding portable Diesel generating sets to their range of products. These will be similar in style to the stationary engines, and will be available in various sizes of from 20 to 200 kW. Special trailers, which can be hitched to motor lorries, have been designed to carry the engines to any points affected.

High-rupturing-capacity Cartridge Fuses

High-rupturing-capacity fuses for AC or DC up to 660 V are the latest introduction by DORMAN & SMITH, LTD., Ordsal Electrical Works, Salford, Manchester, 5.

These fuses can be used on three-phase circuits with an anticipatory short-circuit value of 25,000 kVA. The cartridge is mounted in a porcelain carrier and base conforming to both the Home Office preference and to B.S.S. No. 88 concerning temperature rise. Three sizes are made for maximum currents of 30, 60 and 100 A and wired for 2, 4, 6, 10, 15, 20, 25 or 30 A; 20, 25, 30, 40, 50 or 60 A; and 30, 40, 50, 60, 80 or 100 A, respectively, as required.



"Ordsal" h.r.c. cartridge fuse

The porcelain fuse carrier incorporates a protected opening allowing a view of the indicator on the fuse cartridge. There are three types—with front connected terminals at each end; with front connected terminals at one end and back connecting stud for a bus-bar at the other; or with back connecting terminals at each end.

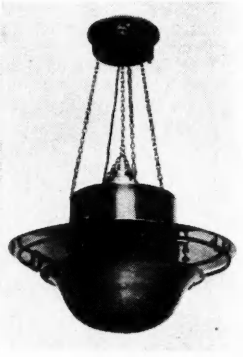
Tests conducted with a 30-A fuse in a 660-V circuit fed by two 1,270 kW DC generators in parallel showed a peak current of 1,220 A, a pre-arcing time of 0.0006 sec. and an arcing time of 0.0073 sec. The peak voltage was 722 V.

With a 100-A fuse test the peak current was 3,780 A with pre-arcing and arcing times of 0.0018 and 0.018 sec., respectively. The peak voltage was 730 V.

Air Heater and Purifier

A 1- or 2-kW heater of aluminium bronze alloy made by the Metropolitan-Vickers Electrical Co., Ltd., has now been added to the pendant air purifier of HAROLD ASHTON, Bull's Head Passage, Market Place, Manchester, 4, to which lighting units can be added.

The air is drawn in at the top of the apparatus by a "Crompton" fan, and blown through sprays of fresh water, to which disinfectant or scent has been added, by a spinning cone which dips into the liquid contained in the bowl. The washed air is then heated and blown out horizontally between the disc and the bowl at a rate of 750 cu. ft. per minute or less according to the position at which the speed regulator is set.



Ashton air purifier and heater

Improved Domestic Appliances

The new domestic appliance catalogue of BULPITT & SONS, LTD., Swansea Works, Camden Street, Birmingham, 1, reveals many improvements in design.

The loading of the two-pint kettles has been increased to 850 W and the "Super" kettle loading is now 1,500 W. The new "Doric" kettle is of unusual shape and can be obtained with a tea pot, hot water jug, cream jug, sugar basin and tray to match. The coffee percolator is now available in silver plate at a lower price than the existing chromium type, while the loading of the porringer has been increased and two heats provided.

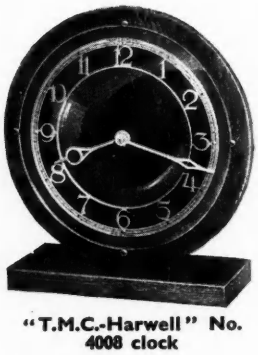
Bulpitt "Cygnet" heating pad

Two new plate warmers have been introduced, with two heats—300 and 150 W—and with a chromium or aluminium top. The water jacketed urns now have a glazed earthenware lining for milk and soup. Both the toaster and the bronchitis kettle have been improved, and a new introduction is the "Cygnet" heating pad, a smaller edition of the "Swan" brand model embodying only two thermostats and housed in a white cover measuring 14½ in. by 12 in. In addition there are a number of reductions in prices.

A New Clock

At an unusually low price T.M.C.-HARWELL (SALES), LTD., 233, Shaftesbury Avenue, London, W.C.2, have introduced a new clock known as the No. 4008. It is finished in oak, walnut or mahogany, and is 4½ in. in diameter.

Mounted on the wooden dial are silver numerals on a black background. A "Bijou" movement is incorporated, and the overall dimensions are 6 in. wide by 6½ in. high by 2¾ in. deep.



"T.M.C.-Harwell" No. 4008 clock

Automatic Liquid Level Control

From LONDEX, LTD., Brettenham House, Lancaster Place, Strand, London, W.C.2, we have received details of an automatic regulator suitable for the indication of liquid level and the control of pump and valves, &c.

The equipment is designed for use with liquids which are under high pressure and where it may be dangerous for them to come into contact with the open atmosphere, such as hydraulic accumulators, liquid air, freon, ammonia, acids and petroleum.

Indication is obtained by using the change in impedance of a coil which takes place when a magnetic core passes through it.

OVERSEAS ELECTRICAL TRADE

Further substantial exports of machinery in February

RATHER unusually, the bulk of British exports of electric motors last month went to foreign, as distinct from Empire, countries, and these were also principally responsible for the large increase in generating plant exported. In the goods and apparatus section as well there were a number of small gains in business with foreign countries which helped to moderate the effect of the rather sharp falling off in shipments to our chief markets.

Taking into account the difference in working days, the total value of electrical exports in February of £1,731,396 may be said to be approximately on a level with that for January, there being in each instance a small but satisfactory improvement on last year's high value (in February, 1938, electrical exports were worth nearly 30 per cent. more than a year before).

As in January, a sharp contraction in exports of goods and apparatus was balanced by the increased value of machinery sent overseas. Last month exports of goods and apparatus were £107,959 less in value than a year before, the decline being spread over twelve of the seventeen classifications. In the chief of these, insulated wires and cables other than telegraphic and telephonic, there was a decrease of £68,250 compared with £61,305 in January. The principal destinations of such exports with comparative values for last month and February, 1938 (in parentheses) were as follows:—

Rubber-insulated wires and cables.—Australia, £29,289 (£32,431); British India, £26,522 (£16,505); South Africa, £19,593 (£13,788); New Zealand, £3,248 (£8,563); other British countries, £17,999 (£26,189); and foreign countries, £13,383 (£18,673). Total, £110,084 (£116,149).

Electric wires and cables, insulation other than rubber.—British India, £37,778 (£45,343); South Africa, £21,849 (£52,966); Australia, £13,121 (£37,357); other British countries, £44,015 (£43,598); and foreign countries, £16,116 (£15,750). Total, £132,879 (£195,014).

Exports of telegraph and telephone apparatus were worth £13,936 more than a year ago, but only amounted to £194,437 as compared with £284,629 in January, when the increase over last year was £39,911. The following is an analysis of the chief destinations of exports of this kind in February, with comparative values:—

Australia, £55,042 (£57,604); South Africa, £17,877 (£13,937); other British countries, £73,992 (£49,083); Argentina, £13,685 (£16,808); and other foreign countries, £33,841 (£43,069).

Radio sets sent to overseas markets last month numbered 4,565 against 5,624 in February, 1938, but valves exported, although less in value, numbered 178,612 against 142,503. Similarly, with house service meters there was an increase in number from 14,495 to 15,923, with a fall in value. Electric lamps exported numbered 1,334,642 (against 1,568,864). Vacuum cleaner exports last month were exceptional, attaining a value of £38,581 compared with £19,502 in January and £26,832 in February last year.

Only the principal markets for electrical machinery exported are shown in the Board of Trade return, but for machinery of all types there is a more comprehensive analysis. This shows the chief increases in exports to be to the Soviet Union (£386,734 against £126,023 in February last year), Iran (£166,698 against £72,122), British Malaya (£154,162 against £127,793) and the Netherlands (£173,253 against £123,736).

Electrical imports into this country last month amounted to £246,814, the decrease compared with a year before being within a few pounds of that recorded in January. The following is an analysis of the principal sources from which goods and apparatus were received in this country, with comparative values:—

United States, £55,274 (£55,919); Germany, £53,562 (£60,860); Netherlands, £29,937 (£48,372); Switzerland, £14,378 (£12,088); Belgium, £14,147 (£30,590); France, £11,092 (£11,730); other foreign countries, £15,440 (£21,766); and British countries, £9,082 (£6,704). Total, £202,912 (£248,029).

TABLE I.—EXPORTS AND IMPORTS DURING FEBRUARY.

	Exports. Feb., 1939	Exports. Inc. or dec. compared with Feb., 1938	Imports. Feb., 1939	Imports. Inc. or dec. compared with Feb., 1938
Submarine telegraph and telephone cables	£15,027	– £442	*	—
Telegraph and telephone wires and cables (not submarine)	66,777	– 15,342	*	—
Other insulated wires and cables	242,913	– 68,250	£25,321	– £20,528
Radio receivers, not radiograms (excluding valves)	26,681	– 5,826	7,103	+ 1,014
Radio transmitters (excluding valves)	32,858	– 6,329	*	—
Radio valves	33,238	– 5,106	10,036	+ 567
Other radio parts and accessories	28,005	– 7,715	41,313	– 3,315
Telegraph and telephone apparatus (other than radio)	194,437	+ 13,936	*	—
Electric carbons	*	—	7,478	+ 2,357
Incandescent lamps	42,543	– 8,259	5,354	– 5,920
Other lighting apparatus	52,413	+ 8,793	23,532	– 17,373
Primary batteries	10,730	+ 65	*	—
Accumulators ‡	34,070	– 18,609	*	—
Electric cooking and heating apparatus	33,158	– 766	*	—
House service meters	16,118	– 1,174	*	—
Other electrical instruments (not telegraph or telephone)	19,188	– 7,245	28,118	+ 1,500
Insulating materials not elsewhere specified	16,636	+ 2,567	*	—
Unenumerated electrical goods and apparatus	128,451	+ 11,743	54,657	– 3,419
Electric generators up to 200 kW	35,166	+ 2,853	*	—
Electric generators over 200 kW	152,248	+ 56,436	*	—
Electric motors	169,123	+ 27,344	24,602†	– 3,493
Converting machinery	538	– 4,266	*	—
Transformers for lighting, heating and power, including coils	103,165		*	—
Rectifiers for power-house use	12,717	+ 7,226	*	—
Starting and controlling gear for motors	44,209	+ 3,047	*	—
Switchgear and switchboards (not telegraph or telephone)	169,096	+ 17,500	*	—
Other electrical machinery	13,310	– 2,195	9,165	– 6,915
Electric vacuum cleaners	38,581	+ 11,749	10,135	– 1,648
Total	£1,731,396	+ £11,735	£246,814	– £57,173

* Not classified separately. † Not railway and tramway motors.
‡ Values not completely comparable.

TABLE II.—ELECTRICAL EXPORTS DURING FEBRUARY.

Destination.	Goods and apparatus, Feb., 1939	Inc. or dec. compared with Feb., 1938	Electric generators, Feb., 1939	Inc. or dec. compared with Feb., 1938	Electric motors, Feb., 1939	Inc. or dec. compared with Feb., 1938	Other electrical machinery, Feb., 1939†	Inc. or dec. compared with Feb., 1938
Eire	£43,058	+ £6,004	*	—	*	—	*	—
Channel Islands	13,609	+ 5,902	*	—	*	—	*	—
Palestine	8,374	– 1,423	*	—	*	—	*	—
British West Africa	9,619	– 2,307	*	—	*	—	*	—
Union of South Africa	118,761	– 19,778	£50,943	+ £5,112	£16,086	– £20,921	£102,300	+ £20,241
British India	140,293	– 18,557	21,911	+ 17,870	19,912	– 11,302	46,664	– 1,467
British Malaya	27,134	– 14,789	*	—	*	—	11,610	– 15,035
Ceylon	8,709	– 59	*	—	*	—	*	—
Hong Kong	13,485	+ 871	*	—	*	—	*	—
Australia	158,239	– 28,273	23,579	– 10,145	9,956	– 2,949	30,977	+ 3,621
New Zealand	105,542	– 12,565	*	—	3,775	+ 814	36,648	+ 23,988
Canada	16,647	+ 7,448	645	– 804	6,893	– 654	1,415	– 21,029
Other British Countries	58,509	+ 7,050	23,069	– 5,532	18,844	– 3,414	42,562	– 10,295
Soviet Union	10,269	– 22,355	*	—	*	—	*	—
Sweden	12,503	+ 2,166	*	—	*	—	*	—
Denmark	15,516	+ 3,240	*	—	*	—	*	—
Netherlands	22,645	+ 5,398	*	—	*	—	3,760	– 1,443
Belgium	8,903	– 1,844	*	—	*	—	*	—
France	16,210	– 274	*	—	*	—	1,973	– 1,173
Portugal	2,980	– 4,603	*	—	*	—	*	—
Spain	3,659	+ 915	*	—	*	—	*	—
Italy	3,551	– 2,570	*	—	*	—	*	—
Greece	4,792	+ 460	*	—	*	—	*	—
Rumania	8,580	+ 3,371	*	—	*	—	*	—
Egypt	10,389	– 1,413	*	—	*	—	803	+ 321
China	4,861	+ 842	*	—	*	—	641	– 2,789
Brazil	21,560	– 3,404	*	—	*	—	*	—
Argentina	41,308	– 2,132	*	—	*	—	19,994	+ 18,417
Other Foreign Countries	83,538	– 15,280	67,267	+ 52,788	93,657	+ 65,770	43,688	+ 7,955
	£993,243	– £107,959	£187,414	+ £59,289	£169,123	+ £27,344	£343,035	+ £21,312

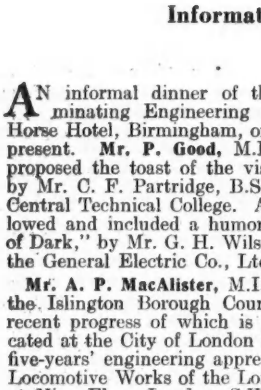
* Not classified separately. † Vacuum cleaners are included in Table I but not in Table II.

PERSONAL AND SOCIAL

Information regarding new appointments and other matters of interest for this page are welcomed

AN informal dinner of the Midland Centre of the Illuminating Engineering Society was held at the White Horse Hotel, Birmingham, on March 10th, and over 100 were present. **Mr. P. Good,** M.I.E.E., president of the Society, proposed the toast of the visitors and this was responded to by Mr. C. F. Partridge, B.Sc., M.I.E.E., of the Birmingham Central Technical College. An entertainment programme followed and included a humorous lecture on "The Production of Dark," by Mr. G. H. Wilson, of the research laboratories of the General Electric Co., Ltd., Wembley.

Mr. A. P. MacAlister, M.I.E.E., chief electrical engineer to the Islington Borough Council Electricity Department, the recent progress of which is described on page 415, was educated at the City of London School, leaving in 1894 to serve a five-years' engineering apprenticeship at the Engineering and Locomotive Works of the London and South-Western Railway at Nine Elms, London, S.W. He left the railway works in January, 1899, to become draughtsman at the Croydon electricity works, under the then chief engineer, Mr. C. H. Minshall, ultimately becoming charge engineer, mains engineer and technical assistant in charge of extension work. In 1902 he supervised the changing of the system in the centre of Croydon from single-phase AC to DC, and two years later he obtained the position of mains superintendent to the Battersea Electricity Department, later becoming chief assistant engineer and acting as chief engineer, pending the appointment of Mr. Bond. His next appointment was as chief assistant and deputy electrical engineer to the Islington Borough Council. In May, 1927, he was appointed chief engineer, and during his time at Islington he has been largely responsible for the work connected with modernising one of the original power-houses and distributing centres operating in the London area. Mr. MacAlister has served on various panels of the British Standards Institution and has been president of the Association of Municipal Electrical Engineers, of which body he is now acting as hon. secretary.



Mr. A. P. MacAlister
[Elec. Rev. photo.

At a board meeting of Drake & Gorham, Ltd., held on March 14th, the chairman, on behalf of the company, presented an inscribed gold watch to **Mr. A. Payne,** to mark his fiftieth anniversary in the service of the company.

Mr. O. G. Cook, chief engineer and manager to the Bingley Urban District Council, has been elected to a seat on the Mid-East England Area Executive Committee of E.D.A.

A gathering of long-service employees of the Metropolitan-Vickers Electrical Co., Ltd., was held on March 20th when 1,150 members of the M.-V. Long Service Association each having twenty-five years or longer service with the company, gathered for the seventeenth annual meeting and supper in the company's dining-hall at Trafford Park. As usual the function was attended by directors of the company, several of whom are among the longest service members of the Association. **Sir Felix J. C. Pole,** chairman of the company and president of the Association, presided. Sir Felix, on behalf of the company, presented a chiming clock or gold watch to 148 employees who have completed thirty-five years' service during this year. With others to whom similar presentations have been made a total of 253 employees have completed thirty-five years or longer with the company.

The sixth annual dinner of the Ipswich and District Electrical Association, which was held on March 17th at the Felix Hotel, Felixstowe, was an occasion principally of saying farewell to **Mr. H. E. Blackiston,** the president and founder of the Association, who is leaving Ipswich shortly to take up the position of borough electrical engineer at Swansea, and all the speakers during the evening paid tribute to the work which he has done as borough electrical engineer at Ispwich and for the Association and the electrical industry in East Anglia generally. Over 150 members of all sections of the industry attended.

Mr. S. C. Grimwade, chairman of the Ipswich Electricity and Transport Committee, referred to the Association as a healthy and lusty infant which had persuaded people of apparently opposite interests to work together. In forming the Association Mr. Blackiston had successfully met the need for making the inhabitants electricity-conscious. One of the good things which the Association had accomplished was the education of the architect in the advantages of electricity.

In responding, **Mr. F. Driesson,** chairman of the Association (who is also chairman of the Ipswich Civil Air Guard), referred to the rapid growth of the Association during its six years of existence. He referred to the "pirates" in the electrical industry, and said that it was only by co-operation that they had been able to achieve many things. Mr. Blackiston had done a great deal in obtaining that co-operation, and on behalf of the members of the Association he asked him to accept a set of bronzes. He welcomed Mr. A. W. Vowles, who succeeds Mr. Blackiston at Ipswich. Mr. Blackiston, in acknowledging the gift, also welcomed Mr. Vowles.

In proposing the toast of "The Visitors," Mr. E. C. Bullard, hon. secretary of the East Anglia sub-branch of the E.C.A., said that he believed that the electrical contractors were being strangled by their own apathy, and he appealed to all contractors who were not members of the E.C.A. to support the national body to help bring about the compulsory registration of operatives and employers. Mr. R. W. Steel, deputy electrical engineer of Norwich, and Mr. L. E. Levee, of Vactric, Ltd., replied. A collection during the evening for the E.I.B.A. realised £8.

Mr. H. G. A. Stedman, M.I.E.E., has been nominated for the chairmanship of the North-Eastern Centre of the Institution of Electrical Engineers for the session 1939-40.

Mr. J. E. Montgomery, B.Sc.(Eng.), M.I.Mech.E., has been appointed secretary of the Institution of Mechanical Engineers, in succession to **Brig.-Gen. M. Mowat,** C.B.E., who has retired on account of ill-health. Mr. Montgomery has been assistant secretary of the Institution since 1920.

The Executive Committee of the Electrical Association for Women is to make a small presentation at the annual general meeting of the Association at Cardiff next month to **Councillor Mrs. Gregory** (West Ham) who is retiring from the office of chairman of the E.A.W. after serving in that capacity for four years.

The last meeting of the twentieth season of the Manchester Electro-Harmonic Society was held at the Waldorf Hotel, Manchester, on March 17th. This took the form of a hot-pot supper and concert, and 150 members and guests were present. Some excellent musical and humorous items were contributed. The baritone, Mr. Harry Poole, is associated with the Stockport Electricity Department, while others who contributed were Messrs. A. Hill (tenor), A. Kinsey and B. Wood (humorists) and E. Cookson (accompanist). Mr. Vlies, secretary to the

Sir Felix Pole making the presentations at the recent gathering of the M.-V. Long Service Association

Music Committee, was congratulated on the programme. The proceedings were under the chairmanship of Mr. H. A. Pryor, The society has a membership of over 180.

Mr. R. J. J. Swan, A.M.I.E.E., engineer and manager of the Chesham Electric Light & Power Co., Ltd., was recently involved in a car collision. We are glad to learn, however, that he escaped injury.

Ex-British Westinghouse men to the number of 140 assembled at the annual reunion in London on Friday, March 10th. In honour of this year's chairman, **Mr. H. S. Aspinall,** the "choir" turned out in surplices and mortar boards to lead the party in singing the now famous "Here we are again" theme song of the Association. As in past years, the proceedings retained those elements of informality which always make them so enjoyable—two set speeches, numerous informal toasts, good entertainment and plenty of time before and after the dinner to meet old friends. **Sir Holberry Mensforth,** in proposing the toast of "The Association," said that in his travels extending over 100,000 miles he had come across old Westinghouse men, almost invariably in good positions, a fine testimony to their early training at Trafford Park. Mr. Aspinall responded and mentioned that next year would witness the "coming of age" of the Association.

Once again the Lancashire Electric Power Co.'s Staff Dramatic Society has put on a successful performance of three one-act plays. After the final curtain on the second night, Friday, March 10th, Mr. S. M. Rix, chairman of the Dramatic Society, on behalf of the audience, thanked and congratulated all those who had in any way contributed to the success of the performance, and presented an electric clock to Mr. I. L. Thomas to mark the occasion of his wedding.

Mr. T. Illingworth, A.M.I.E.E., A.M.I.H.V.E., at present heating engineer to the Hull Corporation Electricity Department, is leaving at the end of the current month to take up the position of electrical and heating engineer to the Office of Public Works, Eire. Mr. Illingworth was apprenticed to Laurence, Scott & Co., Ltd., Norwich, and later became electrical engineer to the New Pelapone Engine Co., Ltd., of Wakefield. He had a wide experience on design and sales with Unity Heating, Ltd., for seven years, including three years as technical representative at Leeds. He was appointed heating engineer to Hull Electricity Department in 1935.

Mr. H. Joseph, M.I.E.E., of the Midland Electric Installation Co., Ltd., has been nominated for the chairmanship of the South Midland Centre of the Institution of Electrical Engineers for the session 1939-40.

OBITUARY

Mr. E. Lefeaux.—We regret to announce the death on March 20th, at Brighton, of Mr. Ernest Lefeaux, A.M.I.E.E., manager of the North Woolwich works of W. T. Henley's Telegraph Works Co., Ltd. Before entering Henley's service in December, 1901, in the Electrical Department at North Woolwich, Mr. Lefeaux had served an apprenticeship with the National Telephone Co. at its London workshops and some of its exchanges. After about a year at Woolwich Works Mr. Lefeaux went to Kirkcaldy in connection with a cable laying contract being carried out by Henley's, and a little later he joined the Contract Department staff, working first as assistant and later as engineer-in-charge of cable laying contracts. He took charge of the whole of the laying of telephone cables for Hull Corporation telephones. In January, 1907, he went to Henley's Gravesend Works as assistant electrician, and was appointed chief electrician there early in 1908, being appointed assistant works manager in March, 1914. He served in the Army during the War, and in February, 1919, he returned to Gravesend works as assistant works manager, and in July, 1919, he was appointed assistant works manager at North Woolwich, being promoted to works manager in June, 1930, on the retirement of Mr. H. Savage. During his long association with the electrical industry, Mr. Lefeaux served on many committees, particularly those of the British Standards Institution and the British Electrical & Allied Industries Research Association.

The late Mr. E. Lefeaux
[Lafayette

Mr. T. G. Hesketh.—We regret to record the death of Mr. Thomas G. Hesketh, M.I.E.E., A.M.I.M.E., M.A.I.E.E., a director of the Folkestone Electric Supply Co., Ltd., which occurred on March 13th at the age of sixty-five. Mr. Hesketh joined the Company at its inception and controlled the works for 36 years. He was managing director until six years ago, but he remained a director until his death.

The Late Mr. H. H. Berry

THE death of Mr. Herbert Henry Berry, M.I.E.E., chairman and managing director of Berry's Electric, Ltd., which we record with regret, has deprived the industry of one who for more than forty years took a very active part in electrical manufacturing and other development.

His career began in London and London became and continued his headquarters to the last. He died on Friday, March 17th, in his sixty-seventh year at 34, Melton Court, S.W.

His education at University College School was followed by technical study at the Finsbury Technical College under the late Silvanus P. Thompson, and in 1889 he entered the service of Siemens Bros., Ltd., at Woolwich.

Six years later, while still quite a young man, he started in business on his own account in Queen Victoria Street, E.C. His early inventions bore especially upon safety-first medium-pressure ironclad switchgear, and for some years the business was carried on under the name Berry, Skinner & Co. Mr. Skinner, who joined Mr. Berry in 1902, continued with him until just before the war.

During these years the Birmingham factory was established and the London offices were changed first to Upper Thames Street and then to premises which have become familiar not only to most electrical traders but also to thousands of visitors from at home and abroad anxious to see the latest advances made in imitation coal fires—we refer to the popular "Touch-button House" in Newman Street, Oxford Street.

Mr. Herbert Berry began his work on the "Magicoal" fire in the year 1916, and a very large number of patents were taken out in connection with it. The restless spirit of enterprise which he and those associated with him (particularly his two sons, Messrs. G. J. G. and Raymond Berry) put into both the production of new designs and the adoption of energetic business-getting methods seemed almost romantic, and the success which followed their courageous efforts and heavy outlay was well deserved.

The business was formed into a private company in 1918 and the present public company was registered in 1928. The interest of Mr. Herbert Berry was not limited to the "Magicoal" fire and fool-proof switchgear, for it will be recalled by readers of the ELECTRICAL REVIEW that he was an advocate of coal-electric ("Coelectric") systems of heating for certain buildings. The development of new designs of fittings and devices for electrical illumination with ingenious changing colour effects had for several years past taken a prominent place in the showrooms.

The late Mr. H. H. Berry
[Elliott & Fry

Apart from the pursuance of his own particular electrical business interests, and his activity in connection with the electrification of flats and small suburban property, Mr. Berry was a very familiar figure in the councils of the electrical trade and industry. He was interested in some of the earliest efforts at electrical industrial organisation.

His very arduous work in the conferences of Committee D, his interest in all electrical exhibition matters (especially a big scheme for a large centrally placed popular electrical exhibition in London), and his energetic co-operation with those who were responsible for the revivification of the Electrical Section of the British Industries Fair at Birmingham, are a few of the matters that occur to one who knew him intimately during practically the whole of his electrical career.

Mr. Berry contributed articles to the pages of this journal on such subjects as the electrical market place of the future, the B.I.F. and electrical progress, electricity in the home, and last of all "The Domestic Hearth" on November 26th, 1937, when the company was celebrating the twenty-first birthday of the "Magicoal" fire.

We feel that many of our readers will desire to be associated with us in tendering sympathy to Mrs. Berry, her two sons and two daughters in the loss which has befallen them. The funeral took place on Wednesday at Bray Church.

COMMERCIAL AND INDUSTRIAL NEWS

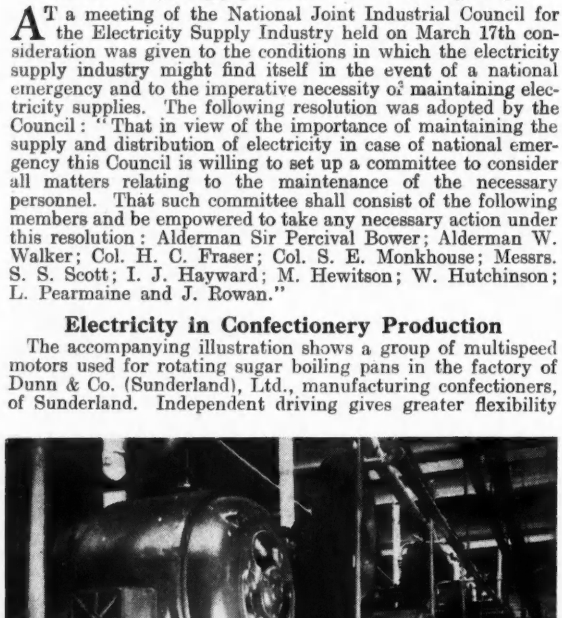
Emergency Supply Committee. Important L.N.E.R. Contracts. Poplar Electric Cooking Entertainment. Birmingham Demonstration House. L.C.C. Jubilee Exhibition

Electricity Supply in National Emergency

AT a meeting of the National Joint Industrial Council for the Electricity Supply Industry held on March 17th consideration was given to the conditions in which the electricity supply industry might find itself in the event of a national emergency and to the imperative necessity of maintaining electricity supplies. The following resolution was adopted by the Council: "That in view of the importance of maintaining the supply and distribution of electricity in case of national emergency this Council is willing to set up a committee to consider all matters relating to the maintenance of the necessary personnel. That such committee shall consist of the following members and be empowered to take any necessary action under this resolution: Alderman Sir Percival Bower; Alderman W. Walker; Col. H. C. Fraser; Col. S. E. Monkhouse; Messrs. S. S. Scott; I. J. Hayward; M. Hewitson; W. Hutchinson; L. Pearmaine and J. Rowan."

Electricity in Confectionery Production

The accompanying illustration shows a group of multispeed motors used for rotating sugar boiling pans in the factory of Dunn & Co. (Sunderland), Ltd., manufacturing confectioners, of Sunderland. Independent driving gives greater flexibility



Brook motors in the confectionery factory of Dunn & Co. (Sunderland), Ltd.

of output according to the demand, while speed variation of the motor itself permits accurate speed control at all stages of the process. It will be noted that a vee-flat drive is used. Twenty motors are employed on this duty alone, and the works are equipped throughout with Brook motors varying in size from ¼ to 45 HP.

Electric Trains for the L.N.E.R.

The L.N.E.R. has recently placed contracts for the passenger coaches which are to be used on the lines now being electrified between Liverpool Street and Fenchurch Street and Shenfield, and between Manchester and Glossop. The new coaches will be of all-steel construction of the open saloon type and will be fitted with electro-pneumatic doors which may be opened by passengers pressing a button or controlled by the train staff. Contracts for one hundred 60-ft. motor coaches and one hundred 55-ft. composite trailer coaches have been placed with the Metropolitan Cammell Carriage & Wagon Co., Ltd., and for one hundred 55-ft. driving trailer coaches with the Birmingham Railway Carriage & Wagon Company, Ltd.

Orders have also been placed with the English Electric Co., Ltd., for ninety-two three-coach electric train equipments for the Liverpool Street-Shenfield trains, and with the General Electric Co., Ltd., for eight three-coach electric train equipments for the Manchester-Glossop trains. The total value of these orders is over £1½ million.

The G.E.C. informs us that the equipment ordered, all of which will be manufactured at the Witton Engineering Works of the company, comprises motors, control gear, auxiliaries, heating, lighting and automatic door gear wiring for eight three-car trains. The nominal supply voltage of the line is 1,500 DC, but provision has to be made for line pressures up to 1,800 V on account of the use of regenerative braking by the locomotives to be employed on this line. The new trains will consist of one motor coach, one driving trailer coach, and one composite trailer coach. Each motor coach will be equipped with four self-ventilated traction type motors having a one-hour rating of 220 BHP each, while the control gear will be of the electro-pneumatic unit-switch type and will be mounted beneath the car underframes.

The English Electric Co., Ltd., says that the total extent of its contract comprises complete electrical equipment for 92 three-coach trains each comprising motor coach, trailer coach and driving trailer coach. Operation will be from overhead line at 1,500 V DC. Each motor coach equipment will consist of four traction motors of 210 HP each, operated by electro-pneumatic control gear, mounted on the coach underframe. Heating will be supplied at 1,500 V, and a motor generator in each motor coach will supply electricity at 50 V. for lighting and control operation. The motors and control equipment will be manufactured at the company's Bradford works.

Work has been in progress for the last twelve months on both the Manchester-Sheffield scheme (of which the Glossop services form part) and on the Liverpool Street-Shenfield scheme. The Shenfield electrification will cater for an intensive suburban passenger traffic, while on the Manchester-Sheffield-Wath lines electric traction will be adopted for all classes of transport, including a very heavy goods and mineral traffic. The two schemes together will cost more than £6 million, and they are being undertaken by the L.N.E.R. as Government Assistance schemes in accordance with the London Passenger Transport (Agreement) Act of July, 1935, and the Railways (Agreement) Act of December, 1935.

E.I.B.A. Annual Luncheon

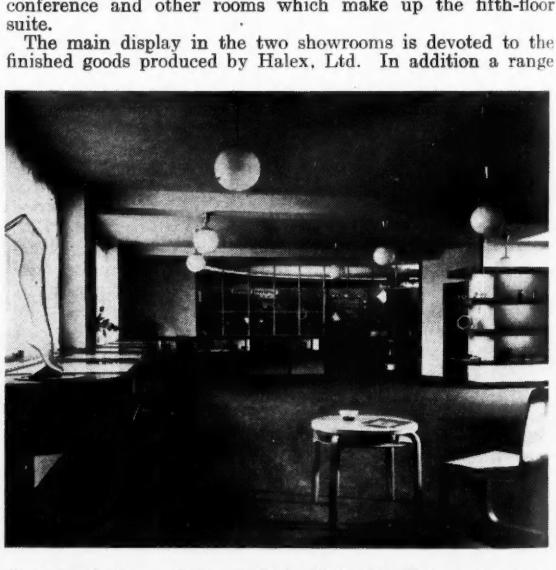
The Electrical Industries Benevolent Association is to hold its annual luncheon at the Savoy Hotel, London, W.C.2, on Friday, April 21st, when Dr. A. P. M. Fleming, President of the I.E.E., will be the principal guest. Tickets (10s. each) can be obtained from the Secretary, 6, Southampton Place, W.C.1. The annual meeting will precede the luncheon at noon and all members are invited to attend.

A London Plastics Centre

At 4-7, Chiswell Street, London, E.C.1, the British Xylonite Co. has just opened new showrooms to replace those established for many years at Milton Street, E.C. The move is the result of various developments both in the company and in the plastics industry as a whole. At the beginning of the present year the growing activities of the company made necessary the formation of two subsidiary concerns, B.X. Plastics, Ltd., and Halex, Ltd., to carry on respectively the production of plastic raw material and the manufacture of finished plastic goods.

The internal arrangement of the new premises, which gives the light, space and orderliness of the best contemporary architecture, is the work of Mr. W. Landauer, who has made use of thermoplastic materials in the equipment and finishing. Mr. H. L. Juliusburger, consulting engineer, was responsible for the lighting—of which there is 10 kW—in conjunction with Troughton & Young, Ltd. Examples of plastic furnishings and fittings are to be found throughout the exhibition galleries, conference and other rooms which make up the fifth-floor suite.

The main display in the two showrooms is devoted to the finished goods produced by Halex, Ltd. In addition a range



A general view of the British Xylonite Co's new showrooms. The shelves on the right are of light mahogany lighted with strip lamps

of eleven showcases displays articles made by customers of B.X. Plastics, Ltd. Each showcase represents an industry—transport, domestic, optical and electrical, wearing apparel, and so on, and here as in the main Halex display there are many examples of goods produced by injection moulding.

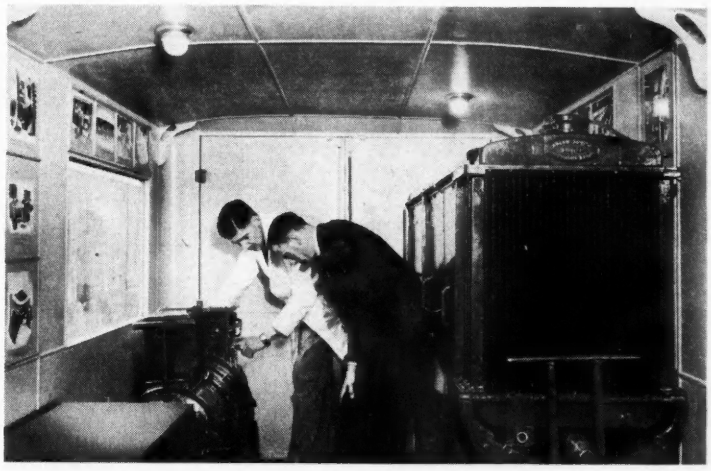
At one end of the main showroom, partly separated from it by a "Super Armourbex" (clear "Bexoid" reinforced with wire mesh) partition, is a "development gallery," and its

purpose is partly to show and partly to suggest new uses and new manufacturing methods for the raw materials of B.X. Plastics, Ltd.

Demonstrating Welding Generators

The "KS" welding generator introduced by LAURENCE, SCOTT & ELECTROMOTORS, LTD., is claimed to have a number of features which can only be properly appreciated from a practical demonstration. It is obviously impossible to send a machine on trial to everybody who may be interested, and L.S.E. have therefore equipped a special demonstration vehicle to enable possible users to try out a set in their own works and under their own conditions.

The vehicle has a special body on a long 3-4 ton chassis, the rear being fitted with a sliding ramp, by the use of which and with the aid of a hand winch mounted in the body any of the welding sets carried can be unloaded and demonstrated on the spot. The vehicle accommodates a Series 10 AC/DC transportable set (maximum output 200 A) and a similar Series 20 (300 A) set for use where 3-phase AC is available, and for demonstration where the supply is DC, or non-standard AC, there is a transportable series 20 petrol engine driven set.



Inspecting a "KS" welding generator in the demonstration van

A very full selection of electrodes is carried in the vehicle so that practically any kind of work can be carried out. The "crew" of the vehicle includes an experienced welder-demonstrator, but whenever possible the firm witnessing the demonstration is encouraged to let its own welder operate the set so that its simplicity and adaptability can be fairly judged. There is ample room in the vehicle for the sets to be examined without removal when a practical example of welding is not required, and a selection of the smaller types of L.S.E. "steel-frame" motors (including a sectionalised stator of an "Emcol" totally enclosed motor and a flameproof machine) is carried.

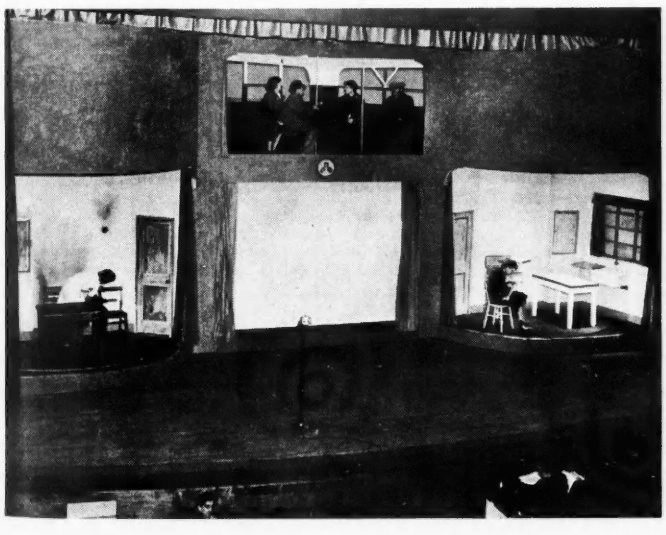
The "KS" welder is made in a wide range of stationary and transportable types for motor or engine drive in two sizes, the Series 10 having an output of 8-200 A and the Series 20 of 12-300 A. Outstanding characteristics claimed are the wide range, stable arc, ease of control and high efficiency.

The demonstration vehicle is now making a number of tours in various districts and demonstrations can be arranged on application to Laurence, Scott & Electromotors, Ltd., at Australia House, London, W.C.2.

The Works Management Association

This Association held its annual banquet on March 21st at the Trocadero Restaurant. Lt.-Col. S. M. Tate (vice-chairman) presided in the absence through illness of the president, Sir Valentine Crittall. The attendance constituted a record and works managers from all over the country representing many and varied industries were present with, in addition, a large number of distinguished guests.

Sir Alexander Ramsay proposed the toast of the Association, which was responded to by Mr. G. Chelioti, past chairman of the London branch. The speakers emphasised the importance of the position of the works manager in industry, and expressed the opinion that often works managers found themselves in such positions more by accident than through any special training or careful selection for the post. Sir Alexander Ramsay considered that the raw material was of the utmost importance, and that a man with the right personality ought to be selected early for such a post and receive the necessary training afterwards.



Regret was expressed at the absence of Mr. A. P. Young, chairman of the Association, who has gone to America on business.

New Magnesium Factory

A start has been made on a new magnesium factory for International Alloys, Ltd., on a site adjoining the Roath power station, Cardiff, and orders for machinery are now being placed. The factory is scheduled to commence production in September next and when running will consume 120,000,000 kWh per annum for an output of 2,000 tons of alloy a year.

Wages in the Cable-making Industry

The Joint Industrial Council for the Electrical Cable-making Industry announces that the cost-of-living figure on March 1st (53 per cent. above the 1914 level) will not involve any alteration in wages on the third pay-day in April.

Poplar's Novel Cooking Demonstration

The fifth of the annual series of dramatised cooking demonstrations, which are proving so successful in encouraging the use of electric cookers in Poplar, struck a new and ambitious note when it was held last week, for the first time at the new Town Hall. After an introduction of music and comedy turns provided by Jack Upson and his band "Electricavalcade," as the performance was called, opened with a dramatic presentation portraying the borough's municipal progress during the past thirty years. This was presented on a stage set in an original form. It necessitated a cast of six, and a set incorporating two revolving stages, a stage to roll down to the footlights, a stage in mid-air and a disappearing lantern screen. The action of the play took place on the top of a bus which was represented on the upper stage, lighting and sound effects giving the impression of motion. As the players gave their reminiscences and drew comparisons with modern conditions, their points were illustrated on a screen immediately beneath them on the revolving stages.

The progress of the municipal health, child welfare, baths, washhouse and finally electric cooking services were illustrated, various rehousing schemes providing exceptionally graphic contrasts between modern blocks of flats and the slums which once occupied the same sites.

The cooking demonstration proper which followed was given in a most convincing fashion with perfect timing by Mrs. Flack, of the General Electric Co., Ltd., which collaborated with the Poplar Electricity Department, under the guidance of Mr. R. Illingworth, the borough electrical engineer, in the presentation of the performance. After this an explanation of the terms under which the cookers might be obtained was given by Alderman C. W. Key, chairman of the Electricity Committee. He pointed out that there was no installation or hire charge, the only cost to the consumer being 1d. per kWh consumed: this included free maintenance. There was an alternative tariff of 3s. 6d. a month, plus ½d. per kWh used. A 3-pt. kettle was provided free and a water heater or a wash boiler could be installed also at no extra charge. Emphasising the progress made during the past five years Ald. Key pointed out that electricity distributed had increased from 51 million to 71 million

A scene from "Electricavalcade," the dramatised cooking demonstration held at Poplar last week

kWh a year, the average consumption per head of population from 326 to 515 kWh, consumers from 25,000 to 35,000, and cookers installed from 120 to 11,000.

At the conclusion of the proceedings a radio set was presented by Mrs. Key, on behalf of the Electricity Department, to the owner of the 10,000th cooker installed, other electrical gifts being given to "runners-up" and also to holders of lucky tickets. About 9,000 people saw the show during its eight performances and as a result it is confidently expected that the present figure of nearly 45 per cent. of possible users of cookers, the highest in the country, will be surpassed.

Anglo-German Trade Talks

As a result of the discussions between representatives of the Federation of British Industries and the Reichsgruppe Industrie an agreement was arrived at last week. It recognised that a substantial and profitable export trade was vital to both Germany and Great Britain, and provided for negotiations between representatives of particular industries in both countries. The parties undertook to do all in their power to promote and foster such negotiations. It was stated that about fifty industrial groups had already signified their willingness to negotiate and it was decided to set up a joint standing committee of the two national organisations to meet regularly to review progress.

The matter was raised in the House of Commons on Tuesday when Mr. Oliver Stanley, President of the Board of Trade, said that the whole position needed examination in the light of recent events and he had asked the Federation of British Industries to discuss the matter with him. He also said that there was nothing in the agreement which would be in conflict with the interests of American industry.

Long Service

We have received from Messrs. Thomas & Son (Worcester), Ltd., pump and windmill makers, some particulars and a photograph of a group of their employees, ten of them, whose service with the company ranges from twenty-three to forty-seven years, and whose average age is about seventy. The photograph shows them all to be very hale and hearty.

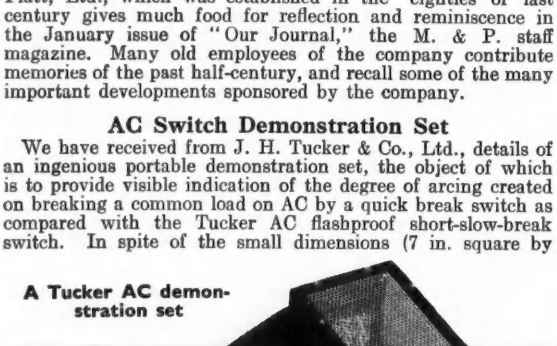
Mather & Platt History

The recent closing of the Salford Iron Works of Mather & Platt, Ltd., which was established in the 'eighties of last century gives much food for reflection and reminiscence in the January issue of "Our Journal," the M. & P. staff magazine. Many old employees of the company contribute memories of the past half-century, and recall some of the many important developments sponsored by the company.

AC Switch Demonstration Set

We have received from J. H. Tucker & Co., Ltd., details of an ingenious portable demonstration set, the object of which is to provide visible indication of the degree of arcing created on breaking a common load on AC by a quick break switch as compared with the Tucker AC flashproof short-slow-break switch. In spite of the small dimensions (7 in. square by

A Tucker AC demonstration set



4½ in. deep) it is self-contained and incorporates an element to give a loading sufficient for temporary demonstration purposes. The element is connected in parallel with the two types of switches, both having the mechanism exposed behind a clear plate-glass panel. A combined plug-adaptor (the plug having adjustable pins) provides a means of obtaining a temporary supply from any socket outlet.

Trade Announcements

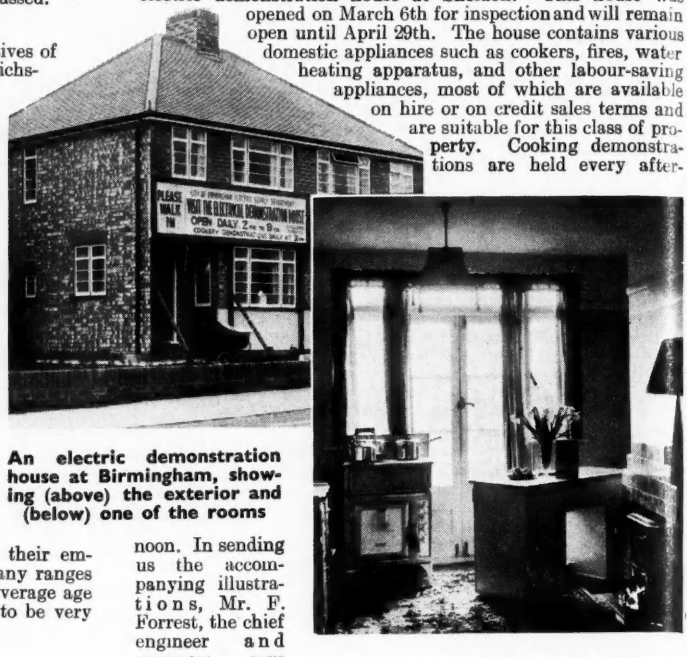
Radiovisor Parent, Ltd., has removed to larger premises at Darnoc House, 36, Alfred Place, London, W.C.1 (telephone: Museum 2888-9; telegrams: Radiovisor, Westcent, London).

The address of the Blackpool branch of the General Electric Co., Ltd., is now 214, Church Street. The telephone number remains unchanged. The telephone number of the Aberdeen branch of the company has been changed to Central 8343-5.

As from March 1st the part of the business of Grosvenor Utilities, Ltd., concerned with Basol products is being conducted under the name of a new company known as Basol, Ltd. The new arrangement does not affect present staff or organisation.

A Birmingham Demonstration House

By arrangement with Davis Estates, Ltd., the Birmingham Corporation Electric Supply Department has equipped an electric demonstration house at Sheldon. This house was opened on March 6th for inspection and will remain open until April 29th. The house contains various domestic appliances such as cookers, fires, water heating apparatus, and other labour-saving appliances, most of which are available on hire or on credit sales terms and are suitable for this class of property. Cooking demonstrations are held every afternoon. In sending us the accompanying illustrations, Mr. F. Forrest, the chief engineer and manager, says that he finds that such demonstration houses are a valuable form of propaganda, well justified by the results obtained, and as a matter of policy the Department opens such houses for inspection in different districts from time to time. The attendance at this particular house has so far been good and the inquiries which are being received are very satisfactory.



An electric demonstration house at Birmingham, showing (above) the exterior and (below) one of the rooms

Prices of Materials

Henry Gardner & Co., Ltd., report, March 22nd: Copper bars (best selected), sheet and rod, no change. English pig lead, no change. Spelter, £14 18s. 9d., £1 2s. 6d. increase. English block ton, £215 15s., £1 15s. decrease. Mercury, no change.

Frederick Smith & Co., report, March 22nd: Electrolytic copper bars, £48 15s., 10s. decrease Ditto, ditto, wire rods, £53 10s., 10s. decrease. Ditto, ditto, h.c. wire, 7/8d., 1/8d. decrease. Silicium bronze wire, no change.

Edward Till & Co., report, March 22nd: India rubber, Para fine, no change.

E.D.A. Diplomas

The British Electrical Development Association has granted five further E.D.A. sales engineers' diplomas, bringing the total granted to forty-seven, and thirteen additional domestic electrical salesmanship diplomas, making a total of 346.

L.C.C. Jubilee Exhibition

In connection with the celebration of the fiftieth anniversary of the establishment of the London County Council an exhibition is now being held at the County Hall covering every branch of the Council's activities—housing and town planning, public assistance, public health, education, including technical, domestic science, art and physical training, main drainage, public protective services, including weights and measures, smoke abatement and meter testing, air raid precautions, the fire brigade, bridge and street improvements, parks and the Green Belt.

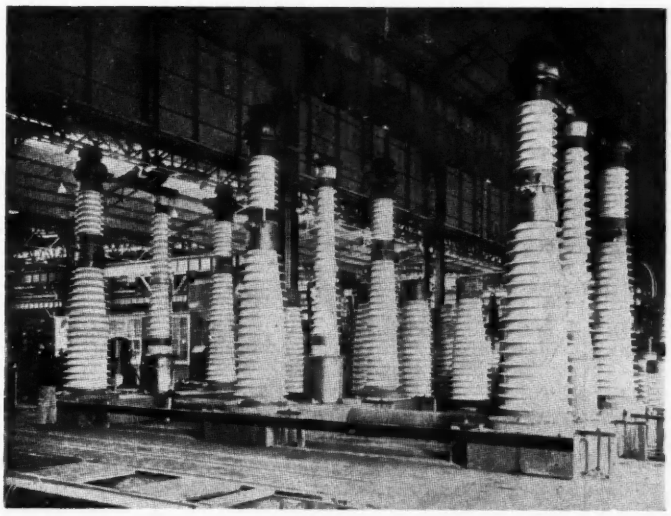
From the electrical point of view the most interesting exhibits are to be found in the hospital and medical services section, where the chemical branch of the Public Health Department is demonstrating a quartz spectrophotometer for determining the vitamin content (particularly vitamin "A") of various substances such as cod liver oil; an electrically heated bomb calorimeter for measuring the heat produced by burning coal, oil, &c.; and an ultra-violet-ray lamp for testing by fluorescence the freshness of eggs, &c.

In the display arranged to demonstrate the technical education facilities are sections devoted to television and the use of electrical equipment, such as sound film, deaf aids, &c., for educational purposes. Much of the apparatus used in the latter section has been made by the students in the School of Photography, Regent Street Polytechnic, who undergo a comprehensive electrical course and when qualified are much in

demand, particularly by television manufacturers and by the British Broadcasting Corporation, so Mr. L. J. Hibbert, who is in charge of the school, told us. The exhibition continues until April 4th.

A Large Circuit-breaker

According to the official journal of the Institute of Electrical Engineers of Japan the Fusi Denki Seizo Co., of Koawasaki, has recently completed the construction for the Kyosenko power station at Tyosen of a 230-kV, 800-A expansion circuit-breaker. It has a rupturing capacity of 3½ million kVA and is of the double break pattern, the arc suppression



High-voltage circuit-breaker recently constructed at a Japanese power station

being of the elastic expansion-chamber type. The breaker uses about 8 cwt. of oil, which is claimed to be only 0.6 per cent. of the quantity usually required, weighs 13 tons and its dimensions are length about 16½ ft. and height 32 ft. It is stated that, when operated by compressed air, the circuit-breaker can be closed in less than one second and that the arc clearing time is but one-tenth of a second.

New Spanish Electrical Association

With the title of the Asociacion Electrotecnica Espanola, a new association of Spanish electrical engineers has been formed in Bilbao. Among the objects of the new organisation are: to establish a central place for meetings of electrical engineers; the consideration of means for the improvement of the production, distribution and utilisation of electric power in Spain; to establish relations with research laboratories in the country and eventually to establish its own laboratory; to draw up rules, regulations and standards under which electrical machinery and apparatus can be granted the Association's mark of official approval; and to collect and collate statistics regarding the generation and distribution of electric power in Spain.

New Catalogues and Lists

Allen West & Co., Ltd., Brighton.—A leaflet certifying that the type "OB" high-voltage switchgear has been tested and has fully satisfied the requirements of B.S.S. 116—1937. Also a pamphlet describing a limit switch.

British Insulated Cables, Ltd., Prescot.—Leaflets dealing with tramway and trolley-bus line fittings.

Wm. Sanders & Co. (Wednesbury), Ltd., Falcon Electricity Works, Wednesbury.—A folder giving revised prices of the Sanders "Super Sanderspeed" fuseboard.

W. Canning & Co., Ltd., Great Hampden Street, Birmingham, 18.—A catalogue of equipment for electro-plating, anodising, and metal finishing in aircraft construction.

W. T. Henley's Telegraph Works Co., Ltd., Holborn Viaduct, London, E.C.1.—A 44-page illustrated booklet describing the "Henley" house service overhead system.

Rd. Johnson, Clapham & Morris, Ltd., Trafford Park, Manchester, 17.—An illustrated catalogue of 44 pages, containing details of electrical accessories.

Johnson, Matthey & Co., Ltd., 73-83, Hatton Garden, London, E.C.1, have issued a new booklet called "Matthey Cadmium Pigments," which will be of interest to cable manufacturers.

Wild-Barfield Electric Furnaces, Ltd., Elecfurn Works, North Road, Holloway, London, N.7.—After an interval of four years the company has issued a new edition of "Works and Laboratory Furnaces." There are 52 pages, profusely illustrated and containing technical drawings and specifications.

Houchin, Ltd., Garford Street, London, E.14.—A leaflet relating to the "Houchin" pulley.

Birmingham Electric Furnaces, Ltd., Birlec Works, Tyburn Road, Erdington, Birmingham.—Details of electric furnace brazing.

A. Reyrolle & Co., Ltd., Hebburn-on-Tyne.—Pamphlet No. 1,056, dealing with flameproof air-break switchgear.

Curtis Manufacturing Co., Ltd., 26-28, Paddenswick Road, Hammersmith, London, W.6.—A catalogue of resistances, charging boards, dimmers, and sliding resistances.

Siemens Electric Lamps & Supplies, Ltd., 38-39, Upper Thames Street, London, E.C.4.—List No. 966, dealing with "Tungsram" valves.

Henry Simon, Ltd., Cheadle Heath, Stockport.—A pamphlet describing the "Simon" conditioner-dryer for wheat conditioning, &c.

Private Arrangement

E. J. Murray, electrical and wireless engineer, 771, Queen's Drive, Broadgreen, Liverpool.—The creditors were called together recently when a statement of affairs was submitted showing liabilities of £912, all due to the trade. The net assets, after allowing £50 for preferential claims, were £306, leaving a deficiency of £605. It was decided that the debtor should execute a deed of assignment in favour of Mr. P. S. Booth, accountant and auditor, Exchange Chambers, 2, Bixteth Street, Liverpool, with a committee.

Bankruptcy Proceedings

H. Etherington, Lawn Villa, Moorgate, and 104, Micklegate, Yorks, electrical and refrigerating engineer and contractor.—The application for discharge herein was heard at the Law Courts, Clifford Street, York, on March 14th. It was reported that the bankruptcy occurred in 1935, when the gross liabilities totalled £3,700. Of that amount £1,250 was expected to rank for dividend. There were no assets. The Judge refused to grant the discharge and the application was dismissed.

R. W. Bradley and B. R. Bradley (trading as W. Bradley & Sons), 75, York Road, Woking, electrical contractors.—At the public examination herein held at the Guildhall, Guildford, Surrey, recently, it was reported that the joint deficiency was £1,591. R. W. Bradley attributed his failure to underestimating contracts and taking over the business at an unfortunate time. The examination was adjourned for closing.

J. T. Townson, radio and electrical engineer, 97, Market Street, Dalton-in-Furness.—Last day for receiving proofs for dividend March 28th. Trustee, Mr. W. G. Pearson, 16, Cornwallis Street, Barrow-in-Furness.

M. R. Horne (Malcolm & Stewart), wireless and electrical retailer, 491, Alum Rock Road, Birmingham.—First and final dividend of 8s. 7d. in the £, payable March 22nd at 37, Temple Street, Birmingham.

W. J. Williams, electrical engineer (Williams & Parry), 81, High Street, Pwllheli.—First meeting, March 24th, at the Official Receiver's office, St. Peter's Churchyard, The Cross, Chester. Public examination, May 5th, at the Court House, Portmadoc.

J. Webster, electrical and radio dealer, 65, Moss Lane, Orrell Park, and 231, Warbreck Moor, Aintree, Liverpool.—Application for discharge to be heard on April 21st, at the Court House, Liverpool.

H. G. Hayward, 42, Wilton Avenue, and lately carrying on business at Cambridge Road, Southampton, and formerly carrying on business at 186, Bitterne Road, Bitterne Park, Southampton (Modern Electric Service), electrical engineer and radio dealer.—Application for discharge to be heard on April 18th, at the Court House, Southampton.

Company Liquidations

Knight & Hitchcox, Ltd., 16, Queen's Road, Watford, electrical engineers, &c.—Observations on the winding up of this company have been issued by the Official Receiver. The statement of affairs shows liabilities of £5,064 against assets of £374. The failure was attributed to lack of proper control and supervision of the various electrical installation jobs and to bad debts. The Court appointed Mr. N. W. Osborne, C.A., of Finsbury Square, E.C., liquidator of the company to act with a committee of inspection.

G. R. Powell, Ltd., 15, Lansdowne Road, S.W.8, electrical engineers.—The first meetings of creditors and shareholders were held on March 16th at the offices of the Board of Trade, Carey Street, W.C. The Official Receiver reported that apparently during the later months of the company's existence several large contracts were executed on which there were delays and the company had had to wait for its money. The company did not have the necessary finance to tide it over those periods and in fact no efforts appeared to have been made to provide it with money. The statement of affairs which had been lodged disclosed assets of £998, while the liabilities amounted to £2,231. The liquidation was left in the hands of Mr. D. R. MacDonald, C.A., of London, who was nominated by the creditors.

Alkaline Miners Lamps, Ltd.—Winding up voluntarily. Joint liquidators, Mr. L. Mitchener, 161a, Strand, London, W.C.2, and Mr. A. Cripwell, Balfour House, Finsbury Pavement, London, E.C.2.

INFORMATION DEPARTMENT

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, &c., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the following:—

WITNEY electric pump.

ALSIFILM products.

ELECTRICITY SUPPLY

Precautions Against Breakdown at Hackney. Newcastle's Emergency Lighting Scheme. Public Lighting Conversion Plan at Portslade. Large Power Plant Extensions at Runcorn

Barnoldswick.—SALE OF UNDERTAKING DISCUSSED.—At a meeting of the Urban District Council on Tuesday it was decided to defer for the present the question of selling the electricity undertaking, for which an offer had been received from the Electrical Distribution of Yorkshire, Ltd. It was agreed to seek expert advice. One unexpected development was Nelson Corporation's inquiry whether the Council would consider an offer by the Corporation to purchase the undertaking. The Barnoldswick Council was given powers to distribute electricity in 1927. A bulk supply is obtained from Nelson Corporation.

Bedford.—SUPPLY EXTENSIONS.—The mains are to be extended to Houghton Conquest, Oakley, Ampthill and Marston.

Beighton (Yorks).—STREET LIGHTING.—At a public meeting a proposal to adopt electricity for street lighting was rejected although the chairman of the Council stated that the use of electricity would bring a reduction in the rates in a few years.

Bromley.—HIGHER STANDING CHARGES.—As from April 1st the standing charge under the "all-in" domestic rate is to be increased from 7 to 10 per cent. and that of the business tariff from £11 to £12 per annum per kW of lighting installed. At a recent meeting of the Town Council Coun. E. J. Bettson, chairman of the Electricity Committee, said that they had to bow to the inevitable. The increase in the price of coal would cost them £6,000 a year, and they had to meet other added costs. For many years the price of electricity had been progressively reduced—in 1928 the average was 5.24d. per kWh while in 1938 it was 1.54d. Of their 14,000 consumers 11,000 had adopted the "all-in" tariff. For a house rated at £17 a year the increase would be 2s. 6d. a quarter.

Burnopfield (Durham).—COLLIERY ELECTRIFICATION.—The Fairside Colliery has changed over to electricity after being operated for over fifty years by steam.

Chester.—LIGHTING AT NEWTON.—The Watch Committee has asked the Electricity Committee to provide lighting in Kingsway, Newton, at a cost of £116.

Chesterfield.—ALTERNATIVE SUPPLY.—The Electricity Committee is to spend £2,343 on providing an alternative means of supply to certain consumers. At present in order to overhaul equipment at the Chatsworth Road generating station it is necessary to tap one of the main trunk extra high voltage bulk supply feeders.

Cleethorpes.—DUAL-CARRIAGEWAY LIGHTING.—A lighting system costing £218, with 200-W gas-filled lamps, is to be installed in the new dual-carriageway section of Sea Road.

Denholme.—CABLES.—Electrical Distribution of Yorkshire, Ltd., is to lay cables between Foreside Lane and Black Edge.

Dundee.—MEDICAL EQUIPMENT.—The governors of Dundee Royal Infirmary have authorised alterations in connection with the reorganisation of the medical electrical department at an estimated cost of £1,000. Orders for the necessary plant and apparatus will be placed almost immediately.

Exeter.—SUPPLY EXTENSION.—The Electricity Committee is to provide a supply to Dunchideock at a cost of £1,500.

ECONOMISERS.—New economisers are to be installed at the power station at a cost of £2,500.

Gloucestershire.—PROTEST AGAINST MINIMUM CHARGE.—At a conference of local authorities in the supply area of the West Gloucestershire Power Co. held at Stroud last week a resolution was passed regretting that the company had fixed a minimum charge for slot meter consumers of £2 12s. per annum and requesting a reduction to £1 10s. Mr. W. A. H. Parker, for the company, said that it was not right that slot-meter consumers should be subsidised at the expense of other consumers.

Grampians.—REDUCED CHARGES.—The Grampian Electricity Supply Co. announces that it is making a reduction in the two-part rate. Under the present arrangements the fixed annual charge is 22s. per room per annum and this is to be reduced to £1. Electricity will be charged at ¾d. per kWh instead of, as at present, a certain number of kWh at 1d., dropping to ¾d.

Hebburn-on-Tyne.—STREET LIGHTING SCHEME INAUGURATED.—A new electric street-lighting system at Hebburn covering four miles of main road and twenty miles of subsidiary roads was formally inaugurated last week. It provides 80 per cent. more light than the former system but the cost is only 4 per cent. more. Mr. E. C. Lennox, of the North-Eastern Electric Supply Co., said there were six sub-stations but the whole system could be linked up and if necessary operated from any central point. A.R.P. workers could be called without the general public being aware that anything was amiss. The new system includes forty-four 400-W and eighty-eight 250-W mercury vapour discharge lamps along the main roads and 586 metal filament lamps of 60 and 100 W in the subsidiary roads.

Lincoln.—EXTENSIONS.—Application is to be made by the Electricity Committee for consent to borrow £7,164 for extensions to meet increased demands.

London.—MODIFICATIONS AT HACKNEY POWER STATION.—The provision of increased protection against the risk of breakdown of the electricity supply has recently been considered by the Hackney Electricity Committee, which is advised that a complete scheme to provide this protection includes the erection of two separate switch-houses to which existing feeder switchgear can be transferred with such additional new switchgear as necessary to deal with the whole of the Hackney and Stoke Newington extra-high-voltage feeder system; and modifications of and additions to such switchgear as necessary to enable the whole of the generating plant to be controlled by the 1,000,000-kVA switchgear as well as feeding the grid transformers and the two switch-houses. The steps to be taken and carried out before next winter are the addition of a greater reactance value to the two main interconnections between the 1,000,000-kVA switchgear and the existing 350,000-kVA switchgear to limit the fault conditions; and the rearrangement of the four Urswick Road feeders controlled by the new switchgear and fed through reactors from the 1,000,000-kVA switchgear instead of a direct connection, thus limiting the fault conditions at the sub-stations beyond the generating station. The switchgear will be located temporarily outside the existing switch-house with housing only sufficient for the purpose, until such time as this gear can be transferred to one of the proposed new switch-houses.

The question of precautions against fire at the generating station has been discussed and it is recommended that the "Mulsifier" system of Mather & Platt, Ltd., shall be adopted. The total cost will be £5,400.

HAMMERSMITH.—Owing to the increased cost of fuel and the general rise in working costs the net loss on the Hammersmith electricity undertaking for the financial year 1938-39 is now estimated at £14,008, as compared with the estimate of £8,332 at the beginning of the financial year, while the net loss for the financial year ending March 31st, 1940, is estimated at £20,837. With the object of reducing the deficiency for the ensuing financial year it is proposed that the rebate of 12½ per cent. which now applies to certain tariffs for the supply of electricity, and also to the charges for the hire of lighting and heating installations provided under the assisted wiring scheme, shall be reduced to 10 per cent. The effect of this revision, which it is proposed to operate as from the March quarter, would be to reduce the estimated net loss in the next financial year to £11,672.

As the two-part tariff for outside lighting and signs is practically the same as that for business premises it is proposed that it shall be discontinued. Another change recommended is the extension of the two-part tariff for public institutions and municipal buildings to include public elementary and secondary schools. A further alteration relates to the tariff for supplies to prepayment consumers for general domestic purposes, comprising a fixed charge, hire charges for apparatus, fittings and wiring installation, and a "unit" charge of ¼d., all collected on a weekly basis through a special type of time-controlled step-rate meter. This collects the running charge and an additional 2½d. per kWh for a prearranged number of kWh each week. The system, however, has not functioned entirely satisfactorily, and it is proposed to discontinue its use. Instead, all electricity will be charged at 1¼d. per kWh through an ordinary prepayment meter, subject to a minimum quarterly consumption.

In order to deal with the anticipated increase in demand it is proposed to build a new sub-station in Masbro' Mews at a cost of £1,228.

Marple.—REVISED SLOT METER TARIFF.—The Urban District Council has decided to discontinue the minimum charge and meter rents in the case of slot meter consumers and substitute an increased charge of ¾d. per kWh, which will about compensate for the loss by the abolition of the minimum charge.

Middlesbrough.—NEW SUB-STATION.—The Town Council is to erect a sub-station in Binks Street.

RATE RELIEF CONTRIBUTION.—The Electricity Committee has decided to contribute a sum equal to 1½ per cent. of the outstanding debt on the electricity undertaking from the electricity profits for the relief of the rates.

Minehead.—RURAL EXTENSIONS.—The Minehead and District Electric Supply Co., Ltd., is extending its supply by overhead lines to the West Somerset villages of Monksilver and Stogumber.

Motherwell.—EXTENSIONS OPPOSED.—The Lanarkshire County Council at a special meeting recently considered the terms of a Provisional Order promoted by Motherwell and Wishaw to extend the area of electricity supply of the burgh. The meeting resolved to oppose the Order.

Newcastle-on-Tyne.—EMERGENCY A.R.P. LIGHTING.—The City A.R.P. Watch Committee is to submit to the Home Office

shortly for approval a £20,000 scheme for emergency lighting at all the A.R.P. centres. The plan provides for emergency generation of electricity for underground shelters at A.R.P. centres. It is proposed to control lighting and radio communication from underground.

Peterborough. — POWER STATION FUEL. — The electricity manager and the power station superintendent were recently authorised to visit Silvertown to examine the use of hard pitch as fuel for generation stations.

Portslade.—STREET LIGHTING CONVERSION.—The Urban District Council has approved a scheme for converting the whole of the street lighting to electricity. It is estimated to cost £3,481 and will include the replacement of 166 gas lamps by 270 electric lamps.

Reigate.—CHARGES RAISED.—The Corporation announces that it is necessary to increase the price of electricity as from April 10th. The lighting flat rate will be raised from 4¾d. to 5d. per kWh, heating and power from ¾d. to 1d., and the domestic two-part tariff running charge from ⅝d. to ¾d. Under the business two-part tariff the fixed charge will be increased from £2 10s. to £3 per kW per quarter. It is proposed to charge 2s. 6d. a quarter for each ordinary meter in excess of one, ½d. per kWh in addition to the normal tariff where a prepayment meter is used, and 3s. 3d. a quarter for rent and unit meters. On the other hand, the minimum charge of 7s. 6d. per quarter is to be reduced to 5s.

Renfrew.—STREET LIGHTING.—The Lighting Committee has agreed to obtain prices for lighting the classified roads on a specification prepared by the Clyde Valley Electrical Power Co. and is requesting the company to prepare a specification for lighting the housing estate roads. The following companies are being asked to submit tenders for both schemes: General Electric Co., Metropolitan-Vickers Electrical Co., British Thomson-Houston Co., Wardle Engineering Co., and Simplex Electric Co.

Roxburgh.—TENANTS PREFER ELECTRICITY.—At a recent meeting of the County Council Public Health and Public Assistance Committee it was stated that a plebiscite had shown that 99 per cent. of the tenants of Council houses at Newtown St. Boswells whose houses are provided with gas, wish to change over to electricity for lighting, and it was decided to install electricity in all such houses.

Runcorn.—EXTENSIONS TO POWER STATION.—The Mersey Power Co., Ltd., is spending £1,500,000 on extensions to the generating plant at the Percival Lane power station, Runcorn. Three 30,000-kW turbo-generators with the necessary buildings, boilers and auxiliary plant will be installed. The extensions, it is expected, will be completed by 1941, and will quadruple the present size and output of the plant. At present there are three generators of 12,000 kW. The fullest possible provision will be made for protection from air raids on the lines recommended by the Home Office.

Selson (Notts).—STREET LIGHTING.—The Council is to raise a loan of £1,052 for street lighting.

Shrewsbury.—REPORT ON SALE OF UNDERTAKING.—When a report on the sale of the electricity undertaking to the West Midlands Joint Electricity Authority was considered by the Town Council last week, Coun. Jones said that this was unquestionably one of the finest financial bargains which the Council had ever made. Several other speakers supported this view, but Coun. Tilling thought they had been stampeded into a sale by the McGowan Report. It was stated that the total receipts from the realisation amounted to £258,776, and after repayment of the mortgage loan debt at the date of sale (£106,286) and discharge of overdraft on the capital account (£54,074) there was available a sum of £98,499.

Walsall.—NEW SUB-STATION.—The Town Council is to erect a sub-station on a site in Delves Green Road.

Wellingborough. — TENANTS MAY INSTALL ELECTRICITY. — Tenants of Council houses will in future be permitted to install electricity at their own expense to replace the gas installations. Where the installation of electricity necessitates removal of the gas copper and geyser, which are the property of the Council, the tenant will have to meet the cost of restoring such fittings at the termination of tenancy. The Wellingborough Electric Supply Co. is to be informed by the Council that in the event of electrical installations being desired by tenants of Council houses permission must be obtained for the removal of the existing fittings.

West Hartlepool.—LOANS FOR APPARATUS.—The Town Council is applying for sanction to borrow £20,000 for cookers; £5,000 for wash boilers and water heaters; £5,000 for meters; and £5,000 for wiring installations.

Weston-super-Mare.—PROMENADE LIGHTING.—About £1,000 is to be spent on additional lighting equipment for the promenade for the coming season.

Weymouth.—RETENTION OF GENERATING PLANT.—The Electricity Committee recently sent a deputation to interview the Central Electricity Board to ascertain whether any arrangements could be made by which the generating plant at the electricity works could be retained in commission on a basis that would not impose upon the undertaking the severe penalties which accrue from accidental breakdown. The deputation reported that the Central Electricity Board was prepared to enter into an agreement with the Corporation, quite apart from the ordinary agreement for the supply of electricity from the grid, as a result of which the generating plant at the electricity station would be held at the disposal of the Central Electricity Board and in return the Board would pay the Corporation an annual sum plus certain other expenses, this arrangement to extend for a period of three years, but to be subject to the Corporation entering into an agreement to take from the grid its full supplies of electricity during the next twenty years. The undertaking would thus be maintained so far as administration is concerned on its existing basis for the next three years and the Committee feels that the financial arrangements proposed to be made with the Central Electricity Board are very satisfactory.

Whitby.—SUPPLY APPLICATION.—The Urban District Council has received a request from residents in the New Gardens area for a supply of electricity and has instructed the electrical engineer to ascertain the possible demand.

Wood Green.—BETTER LIGHTING.—The Corporation has arranged for the North Metropolitan Electric Power Supply Co. to improve the lighting in Bounds Green Road at a cost of £1,780.

Overseas

Australia.—CHEAPER ELECTRICITY IN VICTORIA.—The chairman of the State Electricity Commission of Victoria recently announced reductions in the standard electricity tariffs throughout the State. These are the largest that the Commission has yet made, and are stated to amount to about £235,000 a year.

DISCHARGE LIGHTING.—A system of mercury vapour electric-discharge lighting—the first complete installation of this kind in Victoria—was officially opened in the city of Box Hill recently. At the invitation of the Mayor and Councillors of Box Hill members of neighbouring Councils and other public bodies, together with representatives of the electrical industry, were present at a function at which the Minister for Electric Supply Undertakings, Mr. F. E. Old, commended the Council on its action in installing the system.

Canada.—OTTAWA COMMISSION'S SATISFACTORY YEAR.—The Ottawa Hydro-Electric Commission reports a net surplus of $100,042 in 1938, the highest on record. In 1937 it was $99,267. Income for 1938 totalled $862,161, against $841,767. Total assets were listed at $4,126,684, an increase of $210,076, and liabilities at $3,064,816.

Eire.—REDUCED CHARGES.—The Electricity Supply Board has announced a reduction in the charges for electricity for general lighting amounting to between 20 and 30 per cent. The new rates are as follows:—For the first 1,000 kWh consumed: Dublin, 4d. per kWh; Cork City, 5½d.; other areas, 6d.; For the next 1,200 kWh: Dublin, 3½d. per kWh; Cork, 4½d.; other areas, 5d.; For the next 2,400 kWh: Dublin, 3d. per kWh; Cork, 3½d.; other areas, 4d.; For the next 32,400 kWh: all areas, 2d. per kWh. All over 37,000 kWh: All areas, 1d. per kWh.

Greece.—HYDRO-ELECTRIC DEVELOPMENTS.—According to the French *Journal du Four Electrique* there are a number of waterfalls in Greece suitable for hydro-electric power production, notably in Macedonia and Epirus. Although, owing to the lack of capital, none of them has so far been exploited, the Greek Government, in 1936, granted concessions to two foreign companies to prepare plans for the establishment of power plants on certain rivers for the supply of electric power to projected electro-metallurgical and electro-chemical works to utilise ores obtained from Greek mines. It is now announced that the two concerns referred to have joined together in forming the Hellenic Hydro-Electric Metallurgical Corporation which, with a capital of from 10 to 12 million dollars, will proceed with the construction of some of the plants that have been under consideration. It is stated that such developments would be of great economic advantage to Greece as the availability of cheap hydro-electric power would make it possible for aluminium, magnesium and ferrochrome to be produced in the country.

India.—RURAL ELECTRIFICATION IN BARODA STATE.—Considerable interest is being taken in the practicability of electricity being supplied for rural operations such as irrigation from sub-soil water on the lines adopted in United Provinces, and the advice of Sir William Stampe has been obtained, states our Bombay Correspondent. From the information collected it has been ascertained that there are large areas in the State where the sub-soil water is capable of being utilised for irrigation on a commercial scale. Efforts are now directed to assessing the local village load. It is understood that a project on these lines will be presented within a few weeks for the final approval of Government.

Italy.—OUTPUT OF ELECTRIC POWER IN 1938.—According to statistics published by the Unione Nazionale Fascista Industrie Elettriche the output of electric power in Italy in 1938 amounted to 15,108.2 million kWh compared with 14,960.5 million kWh in 1937, states *Reuter's Trade Service* from Rome. Only 809.9 million kWh was produced in thermal stations Power imported in 1938 from Swiss stations amounted to 244.3 million kWh against 193,609,000 kWh in 1937.

TRACTION

Brighton.—INTRODUCTION OF TROLLEY-BUSES.—Next week trolley-buses will make their appearance and further vehicles will be added each week until the change-over from trams is completed, in the autumn. The total cost of the conversion will be over £400,000.

Eire.—DRUMM BATTERY TRAINS.—The Great Southern Railways Co. has, it is understood, decided to introduce two new Drumm battery trains on the Dublin-Bray suburban services, where similar trains have been in regular operation for a number of years past. Researches in connection with the battery are still being carried on with the aid of Government subsidies, the total sum advanced up to March 31st, 1938, being £151,300. The grant provided in 1937-38 amounted to £46,000, but of this sum £6,239 has not yet been issued. Batteries of this type are now being used on lorries and vans by several firms in the city and are stated to be giving their owners much satisfaction.

Leeds.—TRAMWAY EXTENSIONS.—The Transport Committee proposes to proceed with the construction of a communicating tramway track between the present Balm Road terminus and a new housing estate at Belle Isle; to recommend the City Council to apply for light railway powers over a further extension of reserved tramway sleeper track from the boundary of the Belle Isle estate to the Middleton tramway terminus; and also to make a similar application for the extension of the present light railway powers to serve the new Seacroft housing estate. According to the *Yorkshire Post*, these applications are noteworthy in that practically all future extension facilities will be of the sleeper track type in reserved tracks, and those who are in close touch with transport policy, it says, visualise the time when these tracks may form part of an electric railway system having tubular or subway terminal facilities in the congested centre of the city.

COMMUNICATIONS

Denmark.—GOVERNMENT CONTROL OF TELEPHONE SERVICE.—According to *Foreign Communication News*, the Danish Government will, as from July 1st next, take over the majority of the shares of the various private telephone undertakings in Denmark, including the Copenhagen Telephone Co., which has a capital of 55 million kronors, and so secure control of the telephone service throughout the country.

Sweden.—COASTAL RADIO-TELEPHONE STATIONS.—An extensive system of radio telephone stations is being established along the Swedish coasts, states *Reuter's Trade Service* from Stockholm. The first of these has just been completed and transmits on a wavelength of 111.1 metres. The station will serve navigation in the North Sea and the southern part of the Baltic. The next of these stations will be established at Lulea, in the extreme north of Sweden, and will serve the Bothnian Gulf.

Switzerland—SHORT-WAVE BROADCASTING.—The *Journal des Telecommunications* reports that a short-wave broadcasting station is in course of construction at Schwarzenburg, in the Bernese Alps, at a height of about 2,600 ft. above the sea. The equipment of the station will comprise a Marconi transmitter of a capacity of 25 kW which may, however, be later increased to 50 kW by placing two units in parallel.

Electric Vehicles in War Time

UNCERTAINTY among owners of electrically propelled vehicles whether the recently published scheme for the emergency organisation of goods vehicles applies to them has been reported to the Minister of Transport. On this point it is stated that the scheme is intended to include every mechanically propelled vehicle and trailer operated under an "A," "B," or "C" licence, whatever its method of propulsion. It is considered in the national interest that vehicles using steam, electricity, or gas should be grouped, and that particulars of them should be sent to the chairman of Traffic Commissioners on the forms provided. These should be grouped with other mechanically propelled vehicles during similar work and of a like capacity, irrespective of the means of propulsion.

Mishap at Great Yarmouth

ON Monday last an explosion occurred at Great Yarmouth power station due to the breakdown of a transformer which caused an ignition of oil. On attempting to switch in another transformer, a second explosion occurred as a result of damage to cables in the first. The supply to Lowestoft as well as to Yarmouth was affected from 7.10 until 8.25 p.m., when it was resumed direct from the grid.

Six men were injured, including two police officers, who were investigating the possibility of foul play, but Mr. P. E. Rycroft, borough electrical engineer and manager, is reported to have attributed the explosions to an electrical accident.

FORTHCOMING EVENTS

Institution of Electrical Engineers.—Thursday, March 30th. Institution, London, W.C.2. 6 p.m. "State Tariff Regulation: Recent German Legislation compared with British Tendencies," by Messrs. J. W. Beauchamp and R. Kauffmann.

Informal Meeting.—Friday, March 24th. Institution of Mechanical Engineers, Storey's Gate, Westminster, S.W.1. 6.30 p.m. Joint meeting with the Institutions of Civil and Mechanical Engineers. Discussion on "The Importance of Training in Management for Engineers," to be opened by Mr. T. G. Rose.

North-Eastern Centre.—Monday, March 27th. The Newe House, Pilgrim Street, Newcastle-on-Tyne. 6.15 p.m. "The St. Bartholomew's Hospital X-ray Tube for One Million Volts," by Messrs. T. E. Allibone, F. E. Bancroft, and G. S. Innes.

North-Midland Centre.—Tuesday, March 28th. Hotel Metropole, King Street, Leeds. 7 p.m. Annual general meeting.

North-Western Centre.—Tuesday, March 28th. 17, Albert Square, Manchester. 7.15 p.m. "The Metadyne and its Application to Electric Traction," by Messrs. G. H. Fletcher and A. Tustin.

Scottish Centre.—Tuesday, March 28th. North British Station Hotel, Edinburgh. 7 p.m. "The Empire Service Broadcasting Station at Daventry," by Messrs. L. W. Hayes and B. N. MacLarty.

West Wales (Swansea) Sub-Centre.—Thursday, March 30th. Technical College, Mount Pleasant, Swansea. 6.30 p.m. "Testing of Transmission Line Insulators under Deposit Conditions," by Prof. W. J. John and Dr. C. H. W. Clark.

Association of Ex-Siemens' Men.—Friday, March 24th. Gatti's Restaurant, King William Street, Strand, W.C.2. Smoking concert.

Electrical Power Engineers' Association (*London Local Group*).—Saturday, March 25th. Café Royal, Regent Street, London, W.1. 6.30 for 7 p.m. Annual dinner and dance.

Kent Section.—Saturday, March 25th. Royal Star Hotel, Maidstone. 6 for 6.30 p.m. Annual dinner and dance.

Birmingham Electric Club.—Monday, March 27th. Grand Hotel, Birmingham. 7 p.m. "Railway Electrification," by Mr. J. H. Candsdale.

Association of Supervising Electrical Engineers.—Tuesday, March 28th. College of Technology, Sackville Street, Manchester. 7.30 p.m. "The Factories Act, 1937," by Mr. S. J. Emerson.

London Informal Meeting.—Thursday, March 30th. Aldwych House, Aldwych, London, W.C.2. 7 p.m. "The Production of an Association Journal," by Mr. A. Brammer.

Illuminating Engineering Society.—Tuesday, March 28th. Caxton Hall, Caxton Street, London S.W.1. 7 p.m. "Can Illuminated Signs be Decorative?"

Institution of Post Office Electrical Engineers.—Tuesday, March 28th. King George V Hall, C.T.O. Building, St. Martin's-le-Grand, London, E.C.1. 5.30 p.m. Informal meeting. "Automatic Exchange Extensions," by Messrs. R. D. Thirsk and W. D. Brown.

Electrical Contractors' Association (*Colchester Branch*).—Wednesday, March 29th. Red Lion Hotel, High Street, Colchester. 7 for 7.30 p.m. Dinner and dance.

Rugby Engineering Society.—Friday, March 31st. Albert Buildings, Albert Street, Rugby. 7.30 p.m. Annual general meeting.

Association of Mining Electrical Engineers (*Lothians Branch*).—Saturday, April 1st. "Notes on Rupturing Capacity of Switchgear," by Mr. F. C. Barford.

Textile Physics

FROM March 23rd to 25th the third conference on industrial physics, with special reference to the textile industries, is being held by the Institute of Physics in Leeds. The several lectures and discussions will include an address by Dr. C. C. Paterson, president of the Institute, on "Colour and Colour Rendering" with illustrative demonstrations. There are to be visits to works and research laboratories and an exhibition to which twenty-three manufacturers are contributing, including the British Thermostat Co., Ltd., Cambridge Instrument Co., Ltd., A. Gallenkamp & Co., Ltd., G.V.D. Illuminators, Ltd., General Electric Co., Ltd., George Kent, Ltd., Marconi-Ekco Instruments, Ltd., and the Mercury Switch Manufacturing Co., Ltd.

A special section of the exhibition has been arranged to illustrate the extent to which physics enters into the manufacture of textiles. For example, Leeds University demonstrates the electrical orientation of tiny wood cells in water when subjected to an AC field of 100 V per cm. Sedimentation, followed by evaporation of the water, leaves a thin film of cells in parallel alignment which may be used for X-ray or other means of examination.

The Wool Industries Research Association shows the self-electrification of wool fibres mounted in a bunch on an electroscope, so that they all point in the same direction. When some fibres are pulled from one end the electroscope charges up, and when other fibres are pulled from the opposite end the instrument discharges. An electroscope is also used to demonstrate how variation of the relative humidity of the surrounding air can vary the electrical resistance of wool fibres several hundred times.

FINANCIAL SECTION

New Companies. Official Returns of Capital. Debenture Charges. Reports of Electrical Companies. Dividend Announcements. Transactions in Stocks and Shares

New Companies Registered

Castaphone Manufacturing Co., Ltd.—Private company. Registered March 13th. Capital, £1,000. Objects: To acquire the business of an electrical engineer and wireless dealer carried on by G. Castagnoli at Culver Street, Colchester, as "Castaphone Radio Service." Directors: G. Castagnoli and J. L. Castagnoli, Montague House, Culver Street, Colchester; and R. Lane, "The Firmins," West Bergholt, Essex. Registered office: Montague House, Culver Street, Colchester, Essex.

W. T. Buswell & Co., Ltd.—Private company. Registered March 13th. Capital, £1,000. Objects: To carry on business as electrical engineers and contractors, &c. Directors: W. T. Buswell, 1, Rydal Gardens, South Kenton, Wembley; F. H. Wheeler, 35a, Cheyne Place, Chelsea, S.W.; and C. R. H. Smith, 21, Werter Road, Putney, S.W.15. Secretary: C. R. H. Smith. Registered office: 39, Victoria Street, Westminster, S.W.1.

Bennett Agencies, Ltd.—Private company. Registered March 13th. Capital, £10,000. Objects: To carry on the business of manufacturers of, agents for and dealers in wireless and electrical instruments, apparatus, sets and components of all kinds, &c. Permanent directors: M. V. Dampier-Bennett, 1, Repton Avenue, Wembley, Middlesex, and three others. Registered office: 24, Holborn, E.C.1.

L. R. Wood, Ltd.—Private company. Registered in Dublin, March 15th. Capital, £15,000. Objects: To acquire the business of a dealer in and supplier of electrical goods, wireless sets, cabinets, &c., now carried on by L. R. Wood at Bridge Street, Cork. Directors: L. R. Wood and Mrs. I. K. Wood, both of "Sunlea," Ballintemple, Cork. Secretary: P. Uniacke, 4, Lapps Quay, Cork.

British Tempovox (1939), Ltd.—Private company. Registered March 16th. Nominal capital, £500. Objects: To carry on business as manufacturers of and dealers in counting and recording devices in metal or otherwise, wireless and television sets, electrical goods and appliances, &c. Directors: G. H. Harrison, 15, Warwick Close, Hampton, Middlesex, and S. T. Moore, White Cottage, Adelaide Road, Walton-on-Thames. Registered office: Mandarin House, 69, High Street, Walton-on-Thames.

Heatovent Electric, Ltd.—Private company. Registered in Edinburgh, March 13th. Capital, £1,000. Objects: To carry on the business of manufacturers of and dealers in all kinds of electrical heaters, equipment and appliances, electricians, electrical, mechanical and constructional engineers, &c. R. A. Jackson, 2, Thomson Drive, Bearsden, Dumbartonshire, is the first director. Registered office: 250, West George Street, Glasgow, C.2.

A.1. Radio, Ltd.—Private company. Registered March 16th. Capital, £1,000. Objects: To carry on the business of manufacturers of, agents for and dealers in wireless and television sets, accessories and apparatus, artificial lighting apparatus, electrical fittings, &c. Permanent directors: H. H. Liddiard, 12, Wolverhampton Road, Warley, Birmingham, and D. M. Keogh, 153, Moor Green Lane, Moseley, Birmingham. Secretary: Stanley T. Howle, 8, Waterloo Street, Birmingham.

Irvine Electrical Services, Ltd.—Private company. Registered in Edinburgh, March 16th. Capital, £25,000. Objects: To carry on the business of manufacturers, sellers, hirers, repairers and cleaners of and dealers in magnetos, dynamos, starters, batteries and appliances of all kinds, whether electrical or otherwise, &c. Subscribers: A. E. Dickson, 226, St. Vincent Street, Glasgow, W. S. Adams, 108, Fernleigh Road, Newlands, Glasgow, S.3, and A. J. Doricott, 65, Victoria Road Drive South, Scotstoun, Glasgow, W.4.

Sonograph, Ltd.—Private company. Registered March 16th. Capital, £1,000. Objects: To carry on the business of manufacturers, importers and exporters of and wholesalers and retailers of electric and synchronised and other clocks, watches and motors, manufacturers of and dealers in electric wire and cable, radio, gramophone and television sets, &c. Subscribers: V. S. Burgess, 135, High Street, Plumstead, S.E.18, and C. E. Holliday, 2, Redcliffe Street, S.W.10. Secretary: J. M. Reeves, 14, Langham Street, W.1.

Tuck & Parker, Ltd.—Private company. Registered March 9th. Capital, £300. Objects: To carry on the business of dealers in electrical apparatus and appliances, and in particular household articles operated by electricity or other motive power, &c. The directors are: S. T. E. Tuck, 60, Longmore Road, Shirley, Birmingham, and F. H. P. Harding, 46, Castleton Road, Upper Walthamstow, E.17. Registered office: 140, Station Road, Chingford.

Wilder Instrument Co., Ltd.—Private company. Registered March 6th. Capital, £1,000. Objects: To carry on the business of manufacturers of and dealers in scientific and electrical instruments, fittings and accessories, wireless, batteries, electric fires, irons, fans, dynamos, &c. Subscribers: F. L. Gray, 34, St. Margarets Avenue, Sidcup, Kent, and H. J. Newman, 10, Ingram way, Greenford Road, Greenford, Middlesex.

Telelectric, Ltd.—Private company. Registered March 3rd. Capital, £1,000. Objects: To carry on the business of wireless and television dealers, electrical contractors and dealers in gramophones, &c. Directors: A. Adams, Tor Wood, Beech Hill Avenue, Camlet Way, Barnet, P. Adams, "Keswick," Creighton Avenue, East Finchley, N.2, and W. P. Adams, 386, Green Lanes, Palmers Green, N. Registered office: 382, Long Lane, Finchley, N.

Tomlinson (Electric Vehicles), Ltd.—Private company. Registered March 8th. Capital, £2,000. Objects: To carry on the business of manufacturers and repairers of and dealers in electric and motor vans, wagons, lorries, cars, omnibuses, &c. Permanent directors: G. G. W. Grazebrook, 23, Queen's Gate Terrace, S.W.7, and H. W. Tomlinson, 15, The Colonnade, Guilford Street, Russell Square, W.C.1. Registered office: 14/16, The Colonnade, Guilford Street, W.C.1.

Fife Electrics, Ltd.—Private company. Registered March 6th. Capital, £200. Objects: To acquire the business of domestic utility suppliers and specialists in labour-saving devices carried on at 25, Fife Road, Kingston-on-Thames, Surrey, and at 43, Cambridge Road, Hastings, Sussex, as the Domestic Supply and Service Co. Directors: G. G. Ormsby, 56, Brae Court, Kingston Hill, Surrey, W. L. Toye, 22, Riverside, Sunbury-on-Thames, and D. C. Dunn, Carmine, Lower Ham Road, Kingston-on-Thames. Secretary: D. C. Dunn.

G. W. Barrand, Ltd.—Private company. Registered March 8th. Capital, £500. Objects: To acquire the business of a radio and electrical engineer carried on by G. W. Barrand, at 137, Wilmslow Road, Withington, and 2a, Melbourne Street, Blackley, Manchester. The directors are: G. W. Barrand, 137, Wilmslow Road, Withington, Manchester, and A. Gillott, 13, Hapton Avenue, Stretford, Manchester. Secretary: W. V. Wood. Registered office: 137, Wilmslow Road, Withington, Manchester.

Ceylon's Electrical Imports

LAST year, when business generally in Ceylon was affected by the decline in price of two of the island's staple products—rubber and copra—imports of electrical goods as a whole showed a further advance. The rise was, however, due to increased imports under the heading of telegraph and telephone material (other than radio).

The majority of the other groups showed a decline. The grand total, including electrical machinery, was 4,020,000 rupees, compared with 3,218,000 rupees in 1937. Towards the end of 1938 the firmer tendency in the prices of tea, coconut products and rubber encouraged business confidence and made up to some extent for the effect which the drought last year exercised on the purchasing power of cultivators, particularly of the minor crops.

	1938 Rs. (000)	Inc. or dec. Rs. (000)
Control and switchgear—		
*Total	138	− 13
Radio instruments and apparatus—		
Total	256	− 21
From United Kingdom	132	− 4
„ Germany	28	+ 15
„ Holland	35	—
„ United States	56	− 29
Other telegraph and telephone instruments—		
*Total	1,236	+ 1,009
Lighting accessories, fittings and switches—		
Total	237	− 106
From United Kingdom	111	− 34
„ Germany	27	− 6
„ Japan	6	− 15
„ United States	4	− 14
„ Hong Kong	77	− 28
Batteries, dry—		
Total	439	+ 5
From United Kingdom	39	+ 1
„ United States	142	− 5
„ Germany	18	+ 7
„ Hong Kong	231	− 2
Other batteries and accumulators—		
Total	38	− 28
Electrical goods and apparatus not elsewhere specified—		
Total	486	+ 60
From United Kingdom	380	+ 33
„ Germany	17	− 14
„ Japan	8	− 3
„ United States	50	+ 28
Transformers and convertors—		
*Total	78	+ 22
Generators and alternators—		
*Total	122	+ 9
Motors—		
Total	68	+ 4
From United Kingdom	60	+ 5
„ United States	4	− 3
Electrical machinery not elsewhere specified—		
Total	164	+ 10
From United Kingdom	119	+ 7
„ Germany	11	− 9
„ Italy	10	+ 8
„ United States	20	+ 3
Rubber insulated wires and cables—		
Total	190	− 34
From United Kingdom	157	− 35
„ Germany	29	+ 8
Other electric wires and cables—		
Total	382	− 79
From United Kingdom	376	− 72
„ Germany	2	− 4
Lamps, gas-filled—		
Total	86	− 6
From United Kingdom	72	− 5
„ Germany	7	+ 1
Electric lamps, other—		
Total	57	− 16
From United Kingdom	43	− 6
„ Japan	4	− 10
Torch bulbs—		
Total	44	− 14
From Japan	13	− 11
„ United States	19	− 12

* Mainly from United Kingdom.

Battery Power Tractors, Ltd.—Private company. Registered March 16th. Capital, £2,500. Objects: To carry on the business of manufacturers and sellers of electric, motor driven and other types of tractors, &c. The life directors are: S. J. Croucher, 27, Victoria Square, S.W.1, and three others.

Bicklea Electrical Co., Ltd.—Private company. Registered March 18th. Capital, £500. Objects: To carry on the business of consultants, consulting engineers, advisers, analysts, &c., in all branches of engineering, and to carry on the business of electrical and/or mechanical engineers, &c. The directors are: L. R. Binns, C.A., 6, Gloucester Street, S.W., and D. S. Davies, 21, Basildon Avenue, Ilford, Essex. Registered office: Dominion Buildings, 2, South Place, E.C.2.

Electrocult, Ltd.—Private company. Registered March 18th. Capital, £100. Objects: To carry on the business of manufacturers and wholesalers, retail distributors, merchants, and exporters of, agents for and consultants concerning all kinds of materials, equipment and processes for the electric heating of glasshouses and other horticultural and agricultural buildings, &c. The permanent directors are: J. W. W. L. Pendleton, 12, Park Avenue, St. Albans, and J. C. Woollcott, 77, Worple Way, Rayner's Lane, Harrow.

Returns of Electrical Companies

Statements of Capital

India Rubber, Gutta Percha & Telegraph Works Co., Ltd.—Capital, £1,250,000 in 250,000 preference, 150,000 preferred ordinary, 100,000 ordinary and 750,000 unclassified shares, all of £1. Return dated January 2nd, 1939. All the preference, preferred ordinary and ordinary shares taken up. £500,000 paid. Mortgages and charges: £374,200.

Express Magneto (Repairs) & Electrical Co., Ltd.—Capital, £2,000 in 1,500 cumulative preference and 500 ordinary shares of £1. Return dated December 26th. All shares taken up. £2,000 paid. Mortgages and charges, £3,000.

Burma Electric Supply Co., Ltd.—Capital, £270,000 in 120,000 ordinary and 150,000 preference shares of £1. Return dated December 28th. 120,000 ordinary and 120,000 preference shares taken up. £100,000 paid on 100,000 preference shares. £140,000 considered as paid on the remainder. Mortgages and charges, nil.

Hibernian Gas & Electric Investments Co., Ltd.—Capital, £500 in £1 shares. Return dated December 28th. 2 shares taken up. £2 paid. Mortgages and charges, nil.

Ellesmere Port Electrical Co., Ltd.—Capital, £500 in 500 shares of £1. Return dated December 28th. 450 shares taken up. £251 paid. £199 considered as paid. Mortgages and charges, nil.

Battery Factors, Ltd.—Capital, £10 in £1 shares. Return dated December 30th. Two shares take nup. £2 paid. Mortgages and charges, nil.

Finnell System, Ltd.—Capital, £3,000 in £1 shares. Return dated December 30th. Two shares taken up. £2 paid. Mortgages and charges, nil.

Kartret Switchgear Co., Ltd.—Capital, £2,500 in £1 shares. Return dated December 30th. All shares taken up. £2,500 considered as paid. Mortgages and charges, nil.

Welding Appliances, Ltd.—Capital, £1.000 in £1 shares. Return dated December 31st (filed March 6th). All shares taken up. £1,000 considered as paid. Mortgages and charges, nil.

Wombwell Electrical Contracting Co., Ltd.—Capital, £500 in £1 shares. Return dated December 31st. 462 shares taken up. £462 paid. Mortgages and charges, nil.

Zendix Electric Co., Ltd.—Capital, £100 in £1 shares. Return dated December 31st (filed February 16th). Two shares taken up. £2 paid. Mortgages and charges, nil.

Wrexham Motor and Electrical Engineering Co., Ltd.—Capital, £5,000 in £1 shares. Return dated December 31st. 1,428 shares taken up. £1,428 paid. Mortgages and charges, nil.

Cable Research, Ltd.—Capital, £5 in 100 shares of 1s. each. Return dated December 31st. Two shares taken up. 2s. paid. Mortgages and charges, nil.

British N.S.F. Co., Ltd.—Capital, £12,500 in 3,000 preference and 9,500 ordinary shares of £1. Return dated December 31st. 1,100 preference and 9,500 ordinary shares taken up. £1,100 paid. £9,500 considered as paid. Mortgages and charges, nil.

High Vacuum Valve Co., Ltd.—Capital, £40,000 in £1 shares. Return dated December 31st. 34,042 shares taken up. £26,542 paid. £7,500 considered as paid. Mortgages and charges, £12,000.

Huntalite, Ltd.—Capital, £2,000 in £1 shares. Return dated December 31st, 1938. 1,800 shares taken up. £1,500 paid, £300 considered as paid. Mortgages and charges nil.

Mann, Egerton & Co., Ltd.—Capital, £370,925 1s. in 250,000 preference shares of £1 and 2,418.501 ordinary shares of 1s. Return dated January 2nd, 1939. 210,415 preference and 710,721 ordinary shares taken up. £198,920 1s. paid on 191,434 preference and 149,721 ordinary shares. £47,031 considered as paid on 18,981 preference and 561,000 ordinary shares. Mortgages and charges: £119,500.

Electrical & Steam Appliances, Ltd.—Capital, £100 in £1 shares. Return dated January 6th, 1939. Two shares taken up. £2 paid. Mortgages and charges nil.

Barlow & Young, Ltd.—Capital, £500 in £1 shares. Return dated January 5th, 1939. All shares taken up. £2 paid, £498 considered as paid. Mortgages and charges nil.

Bray Markham & Reiss, Ltd.—Capital, £20,000 in 10,000 6 per cent. preference and 10,000 ordinary shares of £1. Return dated January 4th, 1939. 7,080 ordinary and 10,000 preference shares taken up. £16.080 paid on 6,080 ordinary and 10,000 preference shares, £1,000 considered as paid on 1,000 ordinary shares. Mortgages and charges nil.

Whittaker Bros., Ltd.—Capital, £7,000 in 1,000 cumulative preference, 5,000 "A" ordinary and 1,000 "B" ordinary shares of £1. Return dated December 31st, 1938. 3,907 "A" ordinary shares taken up. £3.207 paid, £700 considered as paid. Mortgages and charges nil.

Shirebrook Electric Supply Co., Ltd.—Capital, £5,000 in £1 shares. Return dated October 13th. 4,800 shares taken up. £4,162 10s. paid (£1 on 2,800 ordinary and 15s. on 2,000 ordinary). £137 10s. calls unpaid. Mortgages and charges, nil.

Crosland, Ltd.—Capital, £2,000 in £1 shares. Return dated December 31st, 1938. 1,002 shares taken up. £1,002 paid. Mortgages and charges nil.

Baynes Electrical Co., Ltd.—Capital, £2,000 in £1 shares. Return dated October 28th. 356 shares taken up. £356 paid. Mortgages and charges, nil.

Century Electric Co., Ltd.—Capital, £5,000 in £1 shares. Return dated December 5th. 2,387 shares taken up. £2,387 paid. Mortgages and charges, nil.

Precision-Electric, Ltd.—Capital, £500 in £1 shares. Return dated December 29th. All shares taken up. £500 paid. Mortgages and charges, nil.

L. P. S. Electrical Co., Ltd.—Capital, £20,000 in £1 shares. Return dated December 30th. 15,000 shares taken up. £12,000 paid. £3,000 considered as paid. Mortgages and charges, £13,529.

Consolidated Electrical Supplies, Ltd.—Capital, £100,000 in £1 shares. Return dated December 31st. Three shares taken up. £3 paid. Mortgages and charges, nil.

Davies, Kent and Stewart, Ltd.—Capital, £3,500 in 2,500 preference and 1,000 ordinary shares of £1. Return dated December 28th. 2,057 preference and 1,000 ordinary shares taken up. £83 paid on 83 preference shares. £2,974 considered as paid on the remainder. Mortgages and charges, £1,350.

Receivers Appointed

Shearman Bros., Ltd.—E. Swaysland, incorporated accountant, of 601/2, Grand Buildings, Trafalgar Square, W.C.1, was appointed receiver and manager on February 25th, 1939, under powers contained in second debentures dated May 9th, 1938.

Orel Micro Electric, Ltd.—S. B. Green, of 29, Great Pulteney Street, W.1, was appointed receiver and manager on March 8th, 1939, under powers contained in debenture dated April 22nd, 1938.

Mortgages and Charges

Elliston Evans & Jackson, Ltd.—Charge on 98, Bath Road, Bridgwater, Somerset, and land at side, dated March 8th, 1939, to secure £2,000. Holder: A. Phillips, Elmbrook Creamery, Gander Green Lane, Cheam.

Lacrinoid Products, Ltd.—Mortgage dated September 20th, 1935, charged on land with factory and buildings thereon in Stafford Avenue, Ardleigh Green, Essex (being property acquired by the company on February 10th, 1937). Amount owing £7,673. Registered March 4th, 1939, pursuant to Section 81 of the Companies Act, 1929. Mortgagees: Credit for Industry, Ltd.

Hallamshire Electric Co., Ltd.—Mortgage on land in Eyre Lane, Sheffield, dated February 14th, 1939, to secure all moneys due or to become due from the company to Martins Bank, Ltd.

B. & B. Scott, Ltd.—Debenture charged on the company's property, present and future, including uncalled capital, dated February 22nd, 1939, to secure £1,255 4s. 10d. Holder: Mrs. I. E. Benn, 25, Duppas Hill Terrace, Croydon.

Bullers, Ltd.—Satisfaction to the extent of £145,000 (balance outstanding) on March 3rd, 1939, of debentures authorised July 16th, 1920, and registered September 24th, 1920, securing £250,000.

Increases of Capital

Parmeko, Ltd.—The nominal capital has been increased by the addition of £5,000 in £1 ordinary shares beyond the registered capital of £10,000.

A.1 Battery Co., Ltd.—The nominal capital has been increased by the addition of £900, beyond the registered capital of £100. The additional capital is divided into 18,000 ordinary shares of 1s.

Fodor Lighting Co., Ltd.—The nominal capital has been increased by the addition of £7,400, beyond the registered capital of £2,600. The additional capital is divided into 7,400 7 per cent. cumulative preference shares of £1.

Reports and Dividends

The British Thomson-Houston Co., Ltd., held its annual meeting on March 21st, when Mr. William C. Lusk, the chairman, said that the output from the works during the year was the largest in the history of the company, due partly to the large unfilled order book at the beginning of the year. The volume of unfilled orders at the end of the year, while smaller than at the end of 1937, was larger than for any other previous year. The facilities and activities of the Research Department had been further extended, as the company believed that by no other means could its many products be constantly improved and kept abreast of the times, and new processes and products developed to meet new conditions.

Many interesting and important orders were received during the year, including large turbo-alternator sets, switchgear and transformers for the power stations supplying the grid and for mines, collieries, steel mills, and other industrial undertakings; rectifying plant for the railways and the London Passenger Transport Board; and turbine-driven generating sets which would supply all of the electricity for lighting and power purposes on the s.s. "Queen Elizabeth" and the s.s. "Mauretania."

The demand for "Mazda" lamps had continued, and also for "Mercra" and "Sodra" electric-discharge lamps. An active part had been taken in the development of luminescent lighting. The demand for many types of electrical appliances used for the home was less active, particularly after the September crisis. In the case of practically all of these appliances the productive capacity of the country was greatly in excess of the maximum demand, and prices generally had reached unremunerative levels.

In the export market the assistance which some foreign competitors received from their Governments made it more and more difficult for British manufacturers to secure business. They could not meet these forms of competition successfully

alone, even though they offered to sell their products at cost of production, which was often done in order to secure work for factories and to maintain a reasonable proportion of export business.

As to the outlook for 1939, he felt he could not, under the circumstances, attempt a prediction.

The County of London Electric Supply Co., Ltd., held its annual meeting on March 21st, when Sir Bernard E. Greenwell, Bt. (chairman), who presided, said that the C.E.B. took 33 million kWh less last year than in 1937, but they had sold 125 million more kWh to their own consumers, or an increase of 10½ per cent. The installed capacity of the Barking power station was now 462,500 kW, and when the fourth 75,000-kW turbo-generator was installed this year the total would be 537,500 kW. The abnormal maximum demand of about 451,000 kW experienced during the cold spell before Christmas was handled satisfactorily. Extensive construction works had been carried out during the year, and two of the four boiler units in course of erection were brought into service. The fourth 75,000-kW turbo-generator and two further boiler units would be available for service before next winter. The Wandsworth station was called upon to supplement the supply in their southern areas, particularly during the cold weather, and satisfactorily carried a big overload. The capital sub-station at Streatham had more than fulfilled their expectations. The extension of the distribution system during the year to meet the demand of new consumers involved the provision of 109 miles of high-voltage lines and 410 miles of low-voltage mains and the establishment of another 145 transforming stations.

With regard to the recent issue of ordinary shares, he knew that a number of shareholders held the opinion that they ought to have issued the shares at a much lower price, which would have given them a bonus, but the shareholders did not always realise that one of the considerations for extending the tenure of the company from 1931 to 1971 was that the Electricity Commissioners should approve the price and terms of any issue of shares relating to their London undertaking. The report and accounts were adopted, and a resolution was passed authorising an increase in capital from £14,000,000 to £16,500,000 by the creation of 2,500,000 additional £1 shares, of which 1,750,000 will be preference shares and 750,000 ordinary shares.

London Associated Electricity Undertakings, Ltd.—Presiding at the ordinary general meeting held on March 21st, Lord Lytton (chairman) said considerable progress had been made in the standardisation of the system of supply to enable the company to take on large extra loads. The proportion of supply given from the standard system last year was 73 per cent. of the total number of kWh sold. The preparation of the Consolidated Order, in place of the various Provisional Orders now held by Central London Electricity, to which he referred last year, had been proceeded with, and they hoped to make an application to the Electricity Commissioners for their approval during the current year. In pursuance of their policy of reducing rates as quickly as possible, the directors made certain reductions in tariffs at the beginning of 1938. That the company had consistently endeavoured to reduce its charges to consumers was shown by the fact that the average price obtained in 1934 (the year preceding the merger) was 1.804d. per kWh, which compared with 1.451d. per kWh during 1938, a reduction of approximately 20 per cent.

During the four years ended December, 1938, the additional loads had amounted in the aggregate to 196,000 kW, and during the same period 16,000 new consumers had been obtained and 9,000 cookers and water-heaters had been connected, an increase of 130 per cent.

The Lancashire Dynamo & Crypto, Ltd., reports a net profit for 1933 of £143,459, as compared with £133,270 for 1937, to which is added £66,561 brought in. The total ordinary dividend for the year is 15 per cent., plus a bonus of 10 per cent. again making a distribution of 25 per cent. for the year, but the final dividend of 7½ per cent., and the bonus are payable on increased capital. Staff pensions fund receives £1,750, N.D.C. reserve £8,000, and a special allocation of £5,000 is made for investigation of overseas markets. The balance carried forward is £92,945.

The Newcastle and District Electric Lighting Co., Ltd.—In his speech at the annual meeting on March 17th Col. Sir Frank R. Simpson, Bt., said that taking into consideration the adverse factors which had affected the receipts and fuel costs, he thought the results for the year under review might be considered satisfactory. The Newcastle Corporation had power to purchase the company's undertaking this year or in 1940. Should the question of purchase arise, he assured the shareholders that the directors would look after their interests. In January last an arrangement was made for the loan of £200,000 on mortgage for a period of three years. The proceeds of the loan had been utilised in paying off the bank overdraft, repayment of the temporary loans, and making provision for capital requirements during the next three years.

Brown Bros., Ltd.—Mr. J. A. Thomson (chairman and managing director) presiding at the annual meeting held on March 17th, said that their radio department had not escaped the general depression in this industry. There were, however, signs of improvement in the sale of domestic radio sets, and car radio offered considerable scope for future development. Their electrical departments had made substantial progress.

Hoover, Ltd.—Presiding at the annual meeting on March 15th Mr. C. B. Colston (chairman and joint managing director) said that although the year under review was a record one for sales, the profits were down owing to substantial overheads due to the increase in their selling organisation. Had sales for the year increased in proportion to the increased effort which was made he had no doubt that there would have been a substantial increase in profits. In the prospectus for the issue which was made in March, 1937, reference was made to the fact that the board had under consideration the manufacture of other household appliances than electric cleaners, but they had been unsuccessful so far in finding an appliance which stood so pre-eminent in its field as their cleaner. Development on that line, however, was being continued. With regard to their manufacturing facilities, their output was now of such large dimensions that it had paid them to manufacture many of the specialised components which used to be purchased elsewhere. In the middle of last year they sold their millionth Hoover in Great Britain.

The Midland Electric Manufacturing Co., Ltd., held its annual meeting on Tuesday last, when Sir C. Herbert Smith, who presided, said that during the year the erection of the duplicate foundry plant had been completed and the extension and equipment of the factory at Tyseley was now complete. They had taken full advantage of the larger and more fully equipped laboratories. During the year the designs of their range of motor control gear had been reviewed, and last autumn an improved range of this gear was introduced to the market at prices offering still greater value than hitherto. Their policy of introducing new products was being continued and a full development programme was in hand. Many of their products were in demand for A.R.P. requirements. A complete A.R.P. organisation for the protection of their personnel and property had been worked out and a demonstration was carried out in February. A contributory pension and life assurance scheme had been inaugurated for the benefit of the executive staff. This was in addition to a contributory scheme for retirement and other benefits.

The Philco Radio & Television Corporation of Great Britain, Ltd.—Mr. Carleton L. Dyer, the managing director, said, in the course of his address at the annual meeting held on March 20th, that during 1938 there was a further general falling off in radio business, and the policy followed late in 1937 of reducing stocks, even at considerable loss, was justified by subsequent events, but during last year it became necessary for a still further reduction to prevent greater loss and obsolescence, and as the year advanced they came face to face with the fact that radio production would not of itself keep the factory at a profit, at any rate for the time being. Vigorous steps were necessary to revivify the business, and they could only see the possibility of an upswing in the company's position by using its surplus plant and productive capacity to the fullest extent on other business to which they were suited. He said that some measure of success had already attended their efforts to secure other work, but they had a long way to go before they could realise material help from this source. Any other manufacturing work that might be undertaken would not be allowed to interfere with their radio activities. They had kept themselves fully alive to the desirability of manufacturing television receivers. The market was being carefully watched, and although they had not deemed it prudent up to this date to enter the field commercially they had maintained continuous experience internally and were ready to release models of a proven standard of quality upon short notice at such a time as the board could see a reasonable prospect of doing so.

The Watford Electric & Manufacturing Co. reports a balance carried to appropriation account for 1938 of £24,886 (against £22,635 for 1937), to which is added £7,767 brought in. The final ordinary dividend is 10 per cent., making 15 per cent. for the year (same), and £14,573 is carried forward. Meeting: March 29th.

The Isle of Thanet Electric Supply Co., Ltd., reports a profit on working for 1938 of £52,575, as compared with £50,595 in the preceding year, to which is added interest, £2,526, and £3,117 brought in. The ordinary dividend for the year is maintained at 4 per cent., and £3,449 is carried forward.

The Anglo-Portuguese Telephone Co. has announced a final dividend on the ordinary stock of 5 per cent., making 8 per cent., less tax, for the year (same), and a dividend of 8 per cent., on the "A" ordinary shares (same). The net profits were £78,967 (against £78,013 for 1937).

The Automatic Telephone & Electric Co., Ltd., reports profits, after tax, for 1938 of £265,896, as compared with £209,242 for 1937, and net profits of £202,074 (against £148,624). Reserve receives £10,000 and the ordinary dividend for the year is raised from 10 to 12½ per cent. The balance carried forward is £153,159 (against £105,632 brought in).

The South Metropolitan Electric Light & Power Co., Ltd., reports a net revenue for 1938 of £270,798, as compared with £240,052 in the preceding year. From this is deducted debenture interest, £42,871; writing off expenses of debenture issue, £1,625; depreciation, including contributions to sinking funds, £108,431; tax, £7,000; staff superannuation, £10,000; and general reserve, £10,000. The final ordinary dividend is 6 per cent., making 9 per cent. for the year (same), and £47,438 is carried forward. Meeting: March 28th.

S. Guiterman & Co., Ltd.—Application lists opened and closed on Wednesday last for an offer for sale by the Whitehead Industrial Trust of 55,000 £1 6½ per cent. cumulative participating redeemable preference shares at par and 299,930 2s. ordinary shares at 2s. 3d. each.

The Mersey Power Co., Ltd., reports profits of £142,428 for 1938, as against £154,481 for 1937. The ordinary dividend for the year is maintained at 8 per cent. and £1,738 is carried forward (against £8,204 brought in). The report states that a direction has been received from the C.E.B. for extensions to the Percival Lane power station, and the consent of the Electricity Commissioners has been received to the installation of three 30,000-kW turbo-generators with the necessary boiler and auxiliary plant. The estimated cost is £1,500,000, and work on this extension has commenced. At the annual meeting which is being held to-day (Friday) a resolution will be submitted increasing the borrowing powers to £1,500,000.

The Mid-Cheshire Electricity Supply Co., Ltd., reports a net profit for 1938 of £42,669, as compared with £22,542 for 1937. The ordinary dividend for the year is maintained at 8 per cent., and £6,926 is carried forward (against £5,478 brought in). At the annual meeting to-day (Friday) a resolution will be submitted for increasing the capital to £1,000,000 by creating 300,000 £1 shares.

The British Aluminium Co., Ltd., reports a net profit for 1938 of £909,851, as compared with £773,432 for the preceding year, to which is added £101,424 brought in, making £1,011,275. After providing for directors' fees, income tax, debenture stock reserve fund, reserve for depreciation and general reserve it is proposed to pay a final ordinary dividend of 8½ per cent.,

making 12½ per cent., less tax. for the year (same last year on smaller capital), and to carry forward £144,094. Meeting: March 28th.

The Electrical Distribution of Yorkshire, Ltd., reports a profit of £251,745 for 1938, as against £251,476 for 1937, to which is added £58,168 brought in, making £309,913. The ordinary dividend for the year is maintained at 9 per cent., depreciation and reserve receives £100,000, and £59,838 is carried forward.

The Bournemouth and Poole Electricity Supply Co., Ltd., reports a net working profit for 1938 of £174,400, as compared with £183,323 for the preceding year, which with £16,587 brought in makes £190,937 available. After deducting debenture stock interest, &c., and placing £50,000 to reserve for depreciation, renewals, &c., and £5,000 to general reserve, it is proposed to pay a final dividend on the ordinary stock of 9 per cent., making 15 per cent., less tax, for the year (same) and to carry forward £14,848. The sales of electricity increased by 7,824,831 kWh to 66,598,815 kWh. Meeting: March 28th.

The Richmond (Surrey) Electric Light & Power Co., Ltd., reports a revenue balance for 1938 of £33,637, as against £33,662 for 1937, to which is added £2,069 brought in. The final ordinary dividend is 4 per cent., making 7 per cent., less tax, for the year (same), and £1,949 is carried forward. Sales of electricity totalled 13,954,902 kWh, an increase of 1,092,140 kWh as compared with 1937.

The Kent Electric Power Co. (controlled by the County of London Electric Supply Co.) reports a total income of £561,890 for 1938, as compared with £511,136 for 1937, and a net working profit of £113,473 (against £98,179). The ordinary dividend is maintained at 8 per cent. and £125,224 is carried forward.

British Insulated Cables, Ltd., reports a profit on trading (after contingent reserves adjustment), dividends on investments, interest, &c., of £807,874, as compared with £821,358 in the preceding year, to which is added £446,992 brought in, making £1,254,866. After providing for depreciation, debenture interest, &c., there is a balance available of £886,558. It is proposed to place £100,000 to reserve and to pay a final ordinary dividend of 10 per cent., making 15 per cent. for the year, plus a cash bonus of 5 per cent., both less tax, and to carry forward £486,558. Meeting: March 28th.

Associated Electrical Industries, Ltd., reports a record profit for 1938 of £1,399,499, an increase of £109,491 as compared with 1937. The dividend on the ordinary stock for the year is maintained at 10 per cent.

Newman Industries, Ltd., reports a profit for 1938 of £33,192, as compared with £31,441 for 1937, to which is added £3,337 brought in. The ordinary dividend is 20 per cent. for the year (against 25 per cent.), income tax reserve receives £5,500, general reserve £5,500 and £8,429 is carried forward.

The West Gloucestershire Power Co., Ltd., is paying a dividend of 2½ per cent. (against 2 per cent.), less tax.

Stocks and Shares

TUESDAY EVENING.

THE kaleidoscope of the crisis changes from day to day, almost from hour to hour; and, this being the case, Stock Exchange markets are difficult to describe with any degree of assurance. The brunt of the week-end shock came on Monday morning. A good deal of selling took place, mostly, it would seem, of the smaller order, but at any rate sufficient to make its mark upon prices, reducing these, in practically every part of the Stock Exchange, to levels which later in the day served to attract a little buying. The impossibility of forming any worth-while judgment on the situation added to the difficulties of Stock Exchange brokers called upon to give advice to clients who were as much in the dark as themselves as to the probable outcome of events.

There was less selling, it may be stated, than might have been expected, but for all that what selling did occur lay upon prices a fairly heavy hand and it is a long time since our lists have exhibited such a catalogue of substantial declines. What makes this fall the more regrettable, from the purely Stock Exchange point of view, is the fact that until a week ago markets were going along in cheerful fashion. Public confidence had returned to a great extent. People were buying stocks and shares with the intention of putting them away as investments leaving out of account, rashly as subsequent events showed, the immediate likelihood of there being any fresh trouble in Europe. In the hope that the present difficulties may yet blow over, the markets on Tuesday in this week made further recoveries, but prices, as just noted, are heavily down on balance.

A General Reverse

After six weeks of growing familiarity with the appearance of "plus" signs in the accompanying list of shares and prices, the columns for "changes on the week" have to record a general reverse. The following changes may be picked out as representative of the setback in various markets:—

Stock or Share	March 14th	March 21st	Fall
County of London Elec.	45/-	43/6	1/6
General Electric	80/6	78/-	2/6
Johnson & Phillips	40/9	37/6	3/3
British Insulated	4½	4½xd	1/3
London Transport "C"	77½	73½	4
Southern Railway 5 p.c. Pfd.	69½	65	4½
Cable & Wireless Ord.	46½	44½	2
American Tel. & Tel.	177½	165½	12
Brazilian Traction	12½	10⅝	1⅞
Anglo-Arg. Trams 4 per cent.	15	12	3
Elec. & Mus. Industries	13/9	12/-	1/9

A.E.I. and Lancashire Dynamo

The fall of 3s. 6d. to 40s. in the price of Associated Electrical Industries shares may have owed something to the absence of any change in the rate of dividend; some people had expected a small increase on last year's 10 per cent. payment. Total earnings are higher on the year, but the net figure is virtually the same. The shares, which yield a round 5 per cent. at the lower price, are considered to have the sought-after rearmament flavour. Apart from co-operating with the Government in the munitions programme, the company entered the aircraft field last year through taking part control of the Westland Aircraft company.

In the five years to 1936 the Lancashire Dynamo and Crypto Co. doubled the dividend rate four times—the distribution rising from 1¼ to 20 per cent. In 1937 the rate was raised again to 25 per cent. For 1938 the total distribution is again 25 per cent., but is made up on this occasion of 15 per cent. dividend and 10 per cent. cash bonus. In the interest of shareholders, the report says, the intention is now to stabilise dividends at 15 per cent. and to add such cash bonuses as may be justified by events. Crompton Parkinsons, it may be remembered, took a similar decision a month or two ago; they, too, fixed on 15 per cent. as the "standard" dividend rate. Lancashire Dynamo entered 1938 with more work than had been known in the company's experience. A useful increase in profits on the year is accompanied by figures showing record production.

Preference Shares

Among preference shares on offer in the market for electricity supply companies' issues, the yields range from a modest £3 17s. 6d. per cent. on the 4 per cent. shares of Scottish Power and North Metropolitans, at 20s. 9d. to the more generous returns on shares for which the buyer has to pay the unpopular high premium. In the latter category come City of London "eights," at 35s., and Edmundsons' 7 per cents., at 31s., each of which pays over 4½ per cent. on the money. Yields of £4 2s. 6d. per cent. are to be obtained from the 4½ per cent preference shares of British Power and Light and Lincolnshire Electric, each at 22s.; and of £4 7s. 6d. per cent. from Lancashire Electric "sevens" at 34s. 3d. In the electrical manufacturing group, Crompton Parkinson 8 per cent. first preference can be bought at 37s. to yield £4 7s. 3d. per cent.; General Electric 6¼ per cent. "A" shares at 30s. 3d. to yield £4 6s. per cent.; and British Electric Transformer 5 per cent. preference at 24s. 3d. to return £4 3s. per cent.

Telephone Results

The annual reports of the Ericsson and Automatic Telephone companies appeared on the same day of last week. Both reflect the busy conditions in this branch of industry. Ericsson have increased the net profits from £149,000 to £161,000, but are keeping the dividend down to 25 per cent. tax-free—the same rate as for the two previous years. The payment is covered with a margin of profits equal to a further 14 per cent. on the dividend.

The dividends on the Automatic Telephone and Electric ordinary and deferred shares are repeated at 10 per cent., but a 2½ per cent. cash bonus is added. Ordinary and deferred shareholders are entitled, in that order, to a non-cumulative 6 per cent. dividend; they split any balance of profits equally between them. British Insulated Cables are the holders of the £100,000 "A" deferred shares. On the Ericsson shares, which have fallen by 3s. to 38s. 9d. ex dividend, the yield is £3 4s. 6d. per cent. free of tax. Automatic Telephones, at 42s. 6d. ex-dividend, pay £5 17s. 9d. per cent., less tax. The price of the latter went temporarily better on the dividend announcement, but, allowing for the dividend deduction, is finally unchanged on the week.

Cables and Tractions

The Cable & Wireless trio is weak in sympathy with other securities; the preference stock has shed 5 points to 84½. Hopes of revival of the international trade upon which the communication companies largely rely for their earnings, are damped by the German developments. Great Northern Telegraphs are again £1 lower. Marconi Marines dropped to 27s. The price of Globe Telegraph ordinary joined that of the company's preference at 26s. 3d. Anglo-American Telegraphs have given way.

New York has been seriously disturbed by the European crisis. Dollar stocks are nearly all down on the week. American Telephone and Telegraph shares have lost 12 points, going back to 165½. International "Tel. & Tel." at 8¾ are 1½ down, and Western Unions 2, at 22½. In another category of dollar issues, Brazilian Tractions at 10⅝ show a drop of 1⅞. Nor have our own traction stocks escaped in the malaise. British Electric Traction deferred at 850 is 125 lower. Tillings have dropped by 3s. 9d.

Three Essentials

Chances of any considerable replacement of the recent good prices must be measured by the course of coming events. As to what these are likely to be, one man's opinion is probably as good as that of another. On the fall, trust companies and other "institutional" investors have made large purchases. It is at least conceivable that our price-lists of next week will go some way towards restoring the damage done to capital by the fall of the past few days. Study of the current prices, and of the yields which shares afford at these figures, should prove profitable to investment that is a bull of Confidence, Courage and Capital.

ELECTRICAL COMPANIES' SHARES

Prices, dividends and yields

Company	1938 High-est	1938 Low-est	Dividend Pre-vious	Dividend Last	Price Mar. 21	Rise or Fall	Yield p.c. £ s. d.
Home Electricity Companies							
Bournemouth and Poole	68/3	62/–	15	15	66/3	—	4 10 8
British Power & Light	30/9	24/6	7	7	29/6	–6d.	4 15 0
City of London	34/6	28/6	7½	7½	32/6	—	4 13 9
Clyde Valley	42/6	33/–	8	8	35/–	–2/–	4 11 4
County of London	51/9	38/9	10½	10½	43/6	–1/6	4 16 7
Edmundson's :							
% Pref.	33/3	30/–	7	7	30/6	—	4 11 10
Ord.	40/9	18/9	9	9	25/–	–2/–	—
Elec. Dis. Yorkshire	43/6	37/9	9	9	40/–	–9d.	4 10 0
Elec. Fin. and Securities	51/9	49/–	12½	12½	47/6	—	5 5 3
Elec. Supply Corporation	55/–	50/–	12	12	51/3	—	4 13 7
Isle of Thanet	21/3	18/6	4	4	18/6xd.	–1/–	4 6 6
Lancs Light and Power	35/–	26/–	7½	7½	32/6	–¼	4 12 4
Llanelly Elec.	23/6	21/–	5½	5½	21/6	—	5 2 4
Lond. Assoc. Electric	32/9	28/–	7	7	28/9	—	4 17 4
London Electric	36/3	32/–	7	7	33/–	—	4 4 10
London Power Deb. Red.	108¾	100	5	5	103½	—	4 16 6
Metropolitan	51/–	41/–	12	12	48/9	–¼	4 18 0
Midland Counties	39/9	33/–	8	8	37/–	–6d.	4 6 6
Mid. Elec. Power	41/9	37/–	8	9	38/9xd.	—	4 13 0
Newcastle Elec.	31/9	27/6	7	7	28/9	—	4 17 4
North Eastern Electric :							
Ordinary	34/–	25/–	7	7	31/–	–6d.	4 10 4
7% Pref.	34/–	30/–	7	7	31/–	—	4 10 4
Northampton	47/6	43/9	10	10	47/6	+¼	4 4 2
Notting Hill 6% Pref. (£10)	14½	13½	6	6	13½	—	4 15 9
North Met. Elec. :							
Ordinary	49/–	43/–	10	10	45/–	–9d.	4 9 0
6% Pref.	30/6	28/3	6	6	28/–	—	4 5 9
Richmond Elec.	30/6	28/–	7	7	28/9	—	4 17 5
Scottish Power	38/9	32/–	8	8	35/–	–2/–	4 11 6
Southern Areas	22/9	18/6	4½	5	21/6	—	4 13 0
South London	32/6	31/–	7	7	29/6	—	4 15 0
West Devon	23/3	21/3	5	5	1½	—	4 9 0
West Glos.	19/–	16/9	2	2	20/–	—	2 0 0
Yorkshire Elec.	42/–	36/9	8	8	36/6	–6d.	4 7 6
Overseas Electricity Companies							
Atlas Elec.	4/6	2/6	Nil	Nil	3/–	–9d.	—
Calcutta Elec.	44/3	36/3	12*	10*	37/6	—	5 6 7
Cawnpore Elec.	40/–	35/–	10	10	31/3	—	6 7 10
East African Power	28/3	22/6	7	7	25/–	—	5 14 0
Jerusalem Elec.	26/9	23/3	5	6	24/–	—	5 0 0
Kalgoorlie (10/–)	12/–	9/6	7½	7	10/3	—	7 6 4
Madras	34/6	28/9	8*	8	30/–	—	5 6 8
Montreal Power	31½	26½	1½	1½	33	–1/–	—
Palestine Elec. "A"	31/9	27/–	7½*	7½*	26/3	–⅛	5 14 3
Perak Hydro-electric	25/3	17/–	7	6	17/6	—	6 17 2
Shawinigan Power	23½	16½	85cts.	83cts.	21½	–2½	—
Tokyo Elec. 6%	65½	39	6	6	55½	—	10 16 2
Victoria Falls Power	76/3	55/–	12	13½	67/6	–⅜	4 0 4
Whitehall Investments Pref.	22/3	15/–	7½	7½	18/9xd.	+6d.	5 0 0
Public Boards							
Central Electricity :							
1950–70	115¾	97	5	5	108½	–½	4 12 2
1955–75	118¼	100	5	5	110½	–½	4 10 6
1951–73	111	95	4½	4½	105½	—	4 5 4
1963–93	101	85	3½	3½	92½	—	3 14 10
London Elec. Trans. Gtd.	93½	88	2½	2½	87	—	2 17 1
London & Home Counties,							
1955–75	112¾	97½	4½	4½	107	—	4 4 1
Lond. Passenger Transport :							
A	119½	104¾	4½	4½	110	–3½	4 1 10
B	122¾	105	5	5	110	–4½	4 11 0
C	84	68	4½	4	73½	–4	5 8 10
West Midlands Joint Elec.,							
1948–68	115¼	102½	5	5	109½	—	4 11 3
Telegraph and Telephone							
American Tel. & Tel.	160	114	9	9	165½	–12	5 8 9
Anglo-Am. Tel. :							
Pref.	115½	100½	6	6	98½xd.	–1	6 1 10
Def.	28	23	1½	1½	21	–1½	7 2 10
Anglo-Portuguese	23/6	19/3	8	8	23/–	–9d.	6 19 2
Cable & Wireless :							
5½% Pref.	104	76½	4½	5½	84½	–5	6 10 2
Ord.	67¾	34	—	4	44½	–2	9 0 0
Income	102½	99	—	—	99	–½	4 1 0
Canadian Marconi $1	6/6	3/9	—	Nil	4/–	–9d.	—
Globe Tel. & Tel. :							
Ord.	32/6	26/3	5½*	7½*	26/3	–¼	5 14 3
Pref.	27/6	23/9	6	6	26/3	—	4 11 5
Great Northern Tel. (£10)	42½	34	20	20	34½	–1	5 16 0
Inter. Tel. & Tel.	12½	5½	Nil	Nil	8¾	–1½	—
Marconi-Marine	30/6	21/6	10	7½	27/–	–6d.	5 11 1
Oriental Telephone Ord.	59/3	2½	12*	12*	2½	—	4 16 0
Radio Corpn.	9½	4¾	8	6	7½	–½	—
Telephone Props.	13/9	11/3	5	6	13/9	–⅛	8 14 6
Telephone Rentals (5/–)	10/–	7/6	5	6	9/–	–1/–	3 6 8
Western Union	34½	17	2¾	—	22½	–2	—
Traction and Transport							
Anglo-Arg. Trams :							
First Pref.	11/–	2/6	Nil	Nil	6/3	–⅛	—
4% Inc.	31	8	Nil	Nil	12	–3	—
British Electric Traction :							
Def. Ord.	1060	675	5	6	850	–125	—
Pref. Ord.	175	150	8	8	160	—	5 0 0
Bristol Trams	45/–	34/3	8	10	47/–	–6d.	4 5 2
Brazil Traction	14½	7⅛	$1	—	10⅛	–1⅞	—
Calcutta Trams	26/9	21/6	8	8	25/–	—	6 10 8
Cape Elec. Trams	18/6	15/6	5	6	17/6	—	6 17 2
Lancs Transport	35/3	29/3	10	10	35/–	–½	5 14 3
Mexican Light :							
1st Bonds	39	16½	5	5	25	—	—
Rio 5% Bonds	91	47	5	5	75	–2	6 13 4
Southern Rly :							
5% Prefd.	87	48	5	5	65	–4½	7 13 10
5% Pref.	116	83	5	5	91½	–4½	5 9 3
T. Tilling	60/–	36/6	10	10	2⅛	–⅜	4 11 4
Tilling & B.A.	57/–	46/–	10	9*	52/6	—	3 8 7
West Riding	46/3	30/6	10	10	36/3	–¼	—
Equipment and Manufacturing							
Aron Electricity Ord.	40/3	31/–	15	15	31/3	—	9 12 0
Assoc. Elec. :							
Ord.	45/3	32/–	10	10	40/–	–3/6	5 0 0
Pref.	38/9	35/6	8	8	35/6	—	4 10 0
Automatic Telephone & El.	43/–	35/–	10	12½	42/6xd.	—	5 17 9
Babcock & Wilcox	44/–	32/6	10	10	39/6	–3/–	5 1 3
British Aluminium Ord.	54/–	40/–	10	12½	52/6xd.	–3/–	4 15 3
British Insulated Ord.	95/9	77/–	20	20	4½xd.	–¼	4 16 10
British Thermostat (5/–)	16/–	9/–	17½	18½	12/6	–3/3	7 8 0
British Vacuum Cleaner(5/–)	35/9	27/–	40	40	22/–	—	—
Brush Ord.	5/6	4/9	Nil	Nil	5/–	–6d.	—
Callender's	5½	78/6	20	20	81/3	–⅜	4 18 9
Chloride Elec. Storage	77/9	61/–	15	20	80/–	—	5 0 0
Consolidated Signal	116/–	75/–	36½	36¾	85/–	–½	8 11 9
Crabtree (10/–)	29/–	22/–	17½	17½	25/–	—	7 0 0
Crompton Parkinson :							
Ord. (5/–)	32/3	18/9	12½	15	17/6	–½	—
E. K. Cole (5/–)	8/9	4/6	5	10	6/–	–1/6	8 6 8
Elec. & Musical Industries							
(10/–)	16/3	9/–	10	5	12/–	–1/9	4 3 4
Electric Construction	36/–	31/–	10	12½	35/–	–½	7 2 10
Enfield Cable Ord.	5⅜	46/–	25	16½	52/6	–3/9	6 3 10
Electrical Switchgear (10/–)	27/–	22/6	16	16	26/9	—	5 19 8
English Electric	33/–	24/6	10	10	32/–	–½	6 5 0
Ensign Lamps (5/–)	14/3	11/3	—	25	14/–	–6d.	8 18 6
Ericsson Tel. (5/–)	2⅜	31/–	25*	25*	38/9xd.	–3/–	3 4 6
Ever Ready (5/–)	26/3	16/6	45	35	22/3	–1/6	7 17 4
Falk Stadelmann	34/3	27/–	10	10	25/–	–⅛	8 0 0
Ferranti Pref.	27/6	25/–	7	7	24/–	–1/–	5 16 8
G.E.C. :							
Pref.	34/–	31/3	6½	6½	30/–	—	4 6 8
Ord.	79/3	67/–	17½	20	78/–	–½	5 2 7
Greenwood & Batley	27/6	19/–	7	15	26/3	—	11 8 2
Hall Telephone (10/–)	24/6	18/3	15	15	20/–	–⅛	7 10 0
Henley's (5/–)	21/–	16/–	15	20	20/–	–⅛	5 0 0
4½% Pref.	23/–	22/–	4½	4½	22/6	—	4 0 0
Hopkinsons	40/–	32/6	10	12	42/–	+⅛	5 14 3
India-Rubber Pref.	21/9	20/3	5½	5½	21/3xd.	—	5 3 6
Intl. Combustion	5/8	4½	32½	32½	5⅜	–⅛	7 3 6
Ismay Industries (5/–)	6/9	1/–	6	6	9d.	—	—
J. Lucas	57/9	47/6	15	15	55/–	–⅛	5 9 1
Johnson & Phillips	43/9	32/6	10	12½	37/6	–3/3	6 13 6
Lancashire Dynamo	72/3	53/–	20	25	65/–xd.	–½	7 14 0
Laurence Scott (5/–)	12/–	9/–	7	15	11/9	—	6 7 8
London Elec. Wire	35/–	28/3	12	7½	30/–	+6d.	5 0 0
Mather & Platt	49/–	41/3	13½	13½	47/6	–⅛	6 3 0
Metropolitan Elec. Cable Pf.	22/–	21/–	5½	5½	21/3	—	5 3 6
Murex	93/9	66/3	20	20	76/3	–⅛	5 5 0
Pye Deferred (5/–)	12/–	8/–	5	25	10/6	–1/–	11 18 0
Revo (10/–)	36/3	30/–	12	17½	33/9	–⅛	5 3 8
Reyrolle	62/6	49/–	12½	12½	57/6	–½	4 6 10
Siemens Ord.	31/–	20/6	7½	7½	23/9	–½	6 6 4
Strand Elec. (5/–)	6/–	4/–	5	10	5/0	–3d.	10 0 0
S. Smith (1/–)	9/9	6/3	37½	50	8/9	—	5 14 3
Switchgear & Cowan (5/–)	19/6	12/6	20	20	13/9	–⅛	7 *5 6
Telegraph Condenser (10/–)	18/9	12/–	5	5	7/6	–½	6 13 4
Telegraph Construction	2½	36/–	7½	10	37/6	–½	5 6 8
Telephone Mfg. (5/–)	9/9	7/–	9	9	9/–	–1/–	5 0 0
Tube Investments	89/6	70/–	23½	23½	87/–	–½	5 10 4
Vactric (5/–)	9/9	4/6	10	4	3/9	—	5 6 8
Vickers (10/–)	27/–	17/6	10	10	21/–xd.	–3d.	4 15 3
Westinghouse Brake	63/9	45/–	17½	17½	50/–	–½	7 0 0
Walsall Conduits (4/–)	26/–	22/6	—	55	27/6	–3/3	7 17 0
West, Allen (5/–)	6/6	4/6	—	7½	6/9	–6d.	5 17 8

* Dividends are paid free of Income Tax.

NEW PATENTS

Electrical specifications recently published

Compiled by a firm of chartered patent agents. The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1937

14210. "Road-traffic control systems." Siemens & General Electric Railway Signal Co., Ltd., F. A. Downes and N. Herwald. May 21st, 1937. (501191.)

16801. "Thermionic circuit arrangements." Telefunken Ges. für Drahtlose Telegraphie. June 16th, 1936. (501046.)

17344. "Electric circuit-breakers." Igranic Electric Co., Ltd., and W. F. Grafton. June 22nd, 1937. (501195.)

17511. "Mosaic photo-cells and processes of manufacturing same." Radio-akt. Ges. D. S. Loewe. June 23rd, 1936. (501270.)

19523. "Radio receiving circuits employing thermionic valves." Telefunken Ges für Drahtlose Telegraphie. July 14th, 1936. (501048.)

19652. "Sealing of electric conductors into quartz, or ceramic materials." N. S. Oerensofi. June 15th, 1937. (501271.)

19883. "Aerial systems for radio receivers." Telefunken Ges. für Drahtlose Telegraphie. July 17th, 1936. (501051.)

20148. "Electric wave filters." C. Lorenz Akt. Ges. September 4th, 1936. (501132.)

20330. "Electrical musical instruments." J. Compton Organ Co., Ltd., and L. E. A. Bourn. July 22nd, 1937 (501339.)

20462. "Adjusting or selecting mechanism for adjustable devices, for instance, in wireless apparatus." Plessey Co., Ltd., P. J. Packman and P. H. Morrison. July 23rd, 1937. (Cognate application 4975/38.) (501273.)

22997. "Electrically driven kinematograph cameras." K. Vockenhuber and A. Handler. August 21st, 1937. (501279.)

23004. "Thermostatic control means for electric cooking ovens." Revo Electric Co., Ltd., and F. H. Reeves. August 23rd, 1937. (Cognate application 34665/37.) (501401.)

23098. "Electric bushing insulators." A. Reyrolle & Co., Ltd., and D. F. Amer. August 23rd, 1937. (501285.)

23244. "Thermal generation of electric current." H. R. Milnes and Milnes Radio Co., Ltd. August 24th, 1937. (501410.)

23245. "Apparatus for thermal generation of electric current." H. R. Milnes and Milnes Radio Co., Ltd. August 24th, 1937. (501411.)

23263. "Electric switches of the push-bar or pull type." G. Turnock, Ltd., and W. E. Taylor. August 25th, 1937. (501140.)

23300. "Electrical transformer arrangements." Marconi's Wireless Telegraph Co., Ltd., and R. H. Burdick. August 25th, 1937. (501141.)

23301. "Adjustment mechanism for tuning condensers in radio receivers and for like purposes." Marconi's Wireless Telegraph Co., Ltd., and H. C. Norwood. August 25th, 1937. (501348.)

23302. "Television receivers." Marconi's Wireless Telegraph Co., Ltd., D. J. Fewings and R. J. Kemp. August 25th, 1937. (501349.)

23343. "Regulators for dynamo-electric machines." British Thomson-Houston Co., Ltd. August 28th, 1936. (501412.)

23349. "Impulse-sending arrangements for use in telephone or like systems." Automatic Telephone & Electric Co., Ltd., and D. Wright. August 25th, 1937 (501353.)

23418. "Electrical voltage-regulating arrangements." R. I. Bagnall, and Foster Engineering Co., Ltd. August 26th, 1937. (501209.)

23419. "Voltage-regulation arrangements." R. I. Bagnall, and Foster Engineering Co., Ltd. August 26th, 1937. (501357.)

23477. "Apparatus for winding electromotor or dynamo armatures." F. Nolten. August 27th, 1937. (501416.)

23538. "Repeater stations for electric signal transmission systems." Standard Telephones & Cables, Ltd. (C. A. J. Pulles.) August 27th, 1937. (501361.)

23676. "High-frequency amplifiers." Marconi's Wireless Telegraph Co., Ltd. August 29th, 1936. (501211.)

23864. "Tuning devices for radio receivers." F. A. Mitchell. September 1st, 1937. (501370.)

24632. "Electric heating apparatus." J. Lobstein. September 26th, 1936. (Cognate application 24633/37.) (501073.)

25485. "Loudspeakers." General Electric Co., Ltd., and F. H Brittain. September 20th, 1937. (501152.)

28113. "Television transmission tubes." Standard Telephones & Cables, Ltd. November 6th, 1936. (501375.)

28720. "Warning signals more particularly for Diesel, or electrically driven and like vehicles." C. B. V. Desiderio. October 21st, 1937. (501156.)

28868. "Sealed vessels for electric-discharge devices." R. J. Berry (C. Lorenz Akt. Ges.). October 22nd, 1937. (501376.)

29220. "Electric arc lamps." A. Stahn. October 26th, 1937. (Addition to 444241.) (501079.)

29445. "Electric switches especially suitable for use with alternating current." J. B. Tucker. October 28th, 1937. (501377.)

30524. "Composite metals, more particularly for electric contacts, and processes of making them." F. R. Simms, and Compound Electro Metals, Ltd. November 6th, 1937. (501379.)

30760. "Thermionic valve amplifiers and the like." Suddeutsche Telefon-Apparate-Kabel-und Drahtwerke Akt. Ges. Tekade. November 9th. 1936. (Cognate application 30761/37.) (501163.)

32651. "Electric remote-control devices for power plant comprising prime mover and change-speed gearing means driven thereby." Schweiterische Lokomotive und Maschinenfabrik. November 27th, 1936. (501380.)

33380. "Sheathing of electric cables." Okonite-Callender Cable Co., Inc. December 12th, 1936. (Cognate application 33381/37.) (501221.)

34259. "Electric-discharge lamps." General Electric Co., Ltd. (Patent Treuhand Ges. für elektrische Glühlampen.) December 10th, 1937. (Addition to 459323.) (501381.)

1938

2200. Ignition of electric-discharge apparatus." Brown, Boveri & Cie Akt. Ges. March 25th, 1937. (501174.)

6851. "Cathode-ray device." Standard Telephones & Cables, Ltd. May 29th, 1937. (501179.)

6920. "Relaxation oscillation generators." C. Lorenz Akt. Ges. March 5th, 1937. (501096.)

7504. "Electric conduits." C. H. Mauger. March 10th, 1938. (501098.)

8553. "Electrically heated grill-boiling plates." C. B. Backer. March 19th, 1938. (501181.)

9630. "Regulable reactance transformers." Soc. Anon. des Ateliers de Secheron. April 2nd, 1937. (Cognate application 9631/38.) (501182.)

10433. "Two-directional electric telephony systems." Siemens & Halske Akt. Ges. April 5th, 1937. (501234.)

10941. "Electric gas-discharge lamps." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. April 12th, 1937. (501102.)

11835. "Electron multipliers." Farnsworth Television Inc. April 30th, 1937. (501316.)

12967. "Circuit arrangements for varying the tuning of oscillatory circuits." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. May 1st, 1937. (501238.)

13789. Electric boiling plates." Kummler & Matter Akt. Ges. December 10th, 1937. (501240.)

13957. "Electric switches having arc-extinguishing chambers." British Thomson-Houston Co., Ltd. May 20th, 1937. (501241.)

14048. "Radio signalling systems." L. Pungs. May 11th, 1937. (501106.)

15763. "Electric circuit-breakers of the oil-blast type," British Thomson-Houston Co., Ltd. May 27th, 1937. (501390.)

16778. "Printing telegraph apparatus." Creed & Co., Ltd., A. E. Thompson and R. D. Salmon. August 27th, 1937. (Divided out of 490361.) (Cognate application 16779/38.) (501420.)

17798. "Direction finders." Telefunken Ges. für Drahtlose Telegraphie. June 15th, 1937. (501248.)

18447. "Electric lamps and methods of manufacturing the same." British Thomson-Houston Co., Ltd. June 21st, 1937. (501111.)

19574. "Frequency-changers of the electron-discharge tube type." Standard Telephones & Cables, Ltd. August 5th, 1937. (501114.)

20307. "Direction finding radio receivers." Telefunken Ges. für Drahtlose Telegraphie. July 8th, 1937. (501251.)

20398. "Electric incandescent lamps and discharge tubes." Naamlooze Vennootschap Philips' Gloeilampenfabrieken." July 12th, 1937. (501252.)

20551. "Electrolysing devices of the vertical diaphragm type." J. P. Lemaire. July 22nd, 1937. (501115.)

21782. "Devices for closing an electric circuit by means of rails." Felten & Guilleaume Carlswerke Akt.-Ges. July 23rd, 1937. (501391.)

22626. "X-ray tubes." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. August 2nd, 1937. (501253.)

23003. "Modulated carrier-wave receivers." Marconi's Wireless Telegraph Co., Ltd. September 22nd, 1937. (501254.)

24945. "Control systems for selectively connecting rectifiers to load circuits." Westinghouse Brake & Signal Co., Ltd., and S. A. Stevens. August 30th, 1937. (Divided out of 492744.) (501395.)

25167. "Coil-protecting system for indicating leakages between windings or to earth." Maschinenfabrik Oerlikon. September 16th, 1937. (501258.)

25940. "Device for the mechanical recording of sound and like oscillations." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. September 8th, 1937. (501259.)

26183. "Piezo-electric crystals." Telefunken Ges für Drahtlose Telegraphie. September 13th, 1937. (501260.)

28108. "Electric arc-welding machines." British Thomson-Houston Co., Ltd. September 29th, 1937. (501261.)

32595. "Apparatus for electrically testing the thickness of coatings or of other thin layers." W. H. Tait. March 16th, 1938. (Divided out of 498032.) (501333.)

1939

3746. "Electrical musical instruments." J. Compton Organ Co., Ltd., and L. E. A. Bourn. July 22nd, 1937. (Divided out of 501339.) (501397.)

TRADE MARK APPLICATIONS

THE following are among the recent applications for British trade marks.

Objections against any of the proposed marks may be entered within one month from March 15th.

Byray Lamp. British and Best (lettering and design). No. 582,193. Class 13 (III). Electric lamps (ordinary).—Harry Weinbaum, 36, Mill Lane. N.W.6.

Rugla. No. 554,961. Class 50 (III). Electrical insulating substances of asbestos, mica, resin, oils or bitumen, electrical insulating tape, and textile material in combination with glass fibres, &c., for covering electric cables, &c. —Rubberoidwerke Gesellschaft, Hamburg, Germany (British representatives, Dicker, Pollak, Mercer, Tench, & Meyer, 20-23, Holborn, E.C.1).

Crestavin, No. 604,232. Crestin, No. 604,233, and Crestanol, No. 604,235. Class 7 (IV). Synthetic resins.—Scott, Bader & Co., Ltd., 109, Kingsway, W.C.2.

Janco. No. 603,262. Class 9 (IV). Flash-lamp batteries.—Abraham & Philip Slann, trading as H. Slann, 16, Church Street, Hanley, Stoke-on-Trent.

Sectograph. No. 603,536. Class 10 (IV). Radiographic apparatus.—Watson & Sons (Electro-Medical), Ltd., Sunic House, 43-47, Parker Street, Kingsway, W.C.2.

Crypta. No. 603,502. Class 88 (IV). Electric lamps.—Philips Lamps, Ltd., 145, Charing Cross Road, W.C.2.

Robco. No. 604,397. Class 11 (IV). Electric domestic wash-boilers and coppers.—D. Robinson & Co. (Bolton), Ltd., 130-136, Bark Street, Bolton.

CONTRACT INFORMATION

Particulars of work for which tenders are invited, contracts placed, and building schemes promising work for electrical contractors and traders

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses. Further details of items marked with an asterisk can be obtained from the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, London, S.W.1.

Abertillery.—March 24th. Electricity Department. Stores and materials for twelve months. (March 10th.)

Australia.—VICTORIA.—April 18th. State Electricity Commission. Two electric locomotives. (March 10th.)

June 27th. 4,000-kW house sets at the Newport "C" power station. (March 17th.)

April 18th. Two electric locomotives. (T. 19565/39.)*

BRISBANE.—April 21st. Electricity Supply Department. 11,000-V metal-clad switchboards. (T.Y. 20076/39.)*

MELBOURNE.—May 2nd. Posts and Telegraph Department. Spring adjusters, armature benders and contact-breaker benders. (T. 19772/39.)*

April 19th. State Rivers and Water Supply Commission. One steam boiler, complete with superheater and automatic stoker. (T. 19788/39.)*

Ayr.—March 31st. Town Council. Heating and electrical works at new maternity hospital. Schedules from A. Muir, architect, 20, Wellington Square (deposit £2 2s.).

Bath.—March 30th. City Council. Stores and materials for twelve months. (March 17th.)

Birmingham.—April 14th. Electric Supply Department. One seven-panel, 11,000-V, extra-high-voltage metal-clad switchboard. (See this issue.)

Brecknockshire.—April 13th. Standing Joint Committee. Installation of electric lighting in Defynock police station. H. Strickland, county architect, Watton Offices, Brecon.

April 12th. Electric lighting and power installation at Brecon Isolation Hospital. County architect, County Offices. Brecon.

Bromley.—April 14th. Electricity Department. Single- and three-phase static transformers. (See this issue.)

Calderstones (NEAR BLACKBURN).—March 27th. Electric lamps for twelve months. Clerk, Calderstones Institution, Whalley.

Chester.—April 11th. City Council. Electric wiring installation at Blacon school. (See this issue.)

Dagenham.—April 5th. Borough Council. Electrical installation at swimming pool, concert hall, and dressing-rooms. (See this issue.)

Dublin.—March 25th. Sligo Board of Health and Public Assistance. Electrical installation at the county hospital in course of erection at Sligo. Specifications from N. O'Dwyer, 6, Burlington Road.

Dundee.—April 6th. Electricity Department. AC house service meters for twelve months. (March 17th.)

March 29th. Corporation. Lanterns, 150-W sodium lamps, and control gear in boxes, for street lighting. Town Clerk.

Dumfries.—March 28th. Town Council. Electrical installation at new messroom and other accommodation at public abattoir. Town Clerk.

March 31st. Electricity Department. Two 300-kVA transformers. (March 17th.)

Egypt.—CAIRO.—March 29th. Ministry of Public Health. One portable pumping set. (T.Y. 19780/39.)*

May 1st. Ministry of Public Works. Complete electrically driven pumping station at Edfu North. (T.Y. 19778/39.)*

Forres.—March 31st. Town Council. Electrical work at two blocks of houses. Town Clerk (deposit £1 1s.).

Halifax.—April 3rd. Libraries and Museums Committee. Electrical work at the branch library, Pellon. Town Clerk, Town Hall (deposit £1 1s.).

April 3rd. Housing Committee. Electrical work at Charlestown housing estate (thirty-six houses and thirty-six flats). Town Clerk, Town Hall (deposit £2 2s.).

April 8th. Health Committee. Electrical work at new hospital operating theatre block. Town Clerk, Town Hall (deposit £1 1s.).

April 10th. Improvement Committee. One electric passenger lift. Town Clerk, Town Hall (deposit £1 1s.).

India.—NEW DELHI.—April 29th. Indian Stores Department. Train lighting equipment, including dynamos and cut-in switches. (T. 19693/39.)*

April 4th. Sets of train lighting cells to constitute complete batteries. (T. 20059/39.)*

April 4th. One AC electrically driven pumping set. (T. 19691/39.)*

April 27th. Railway carriage electric fans and regulators. (T. 19690/39.)*

Lochgelly (FIFE).—March 27th. Town Council. Electric lighting at 120 houses. Town Clerk (deposit £1 1s.).

London.—H.M. OFFICE OF WORKS.—March 28th. Electric wiring installation at Glascoed and Chorley R.O.F. (March 10th.)

BETHNAL GREEN.—March 31st. Electricity Department. One 500-kVA transformer. (See this issue.)

Manchester.—March 27th. Electricity Committee. Service cut-outs and cables for twelve months. (March 10th.)

April 5th. Diffusing glass shades, electric kettles, meters and AC motors for twelve months. (See this issue.)

Mexborough.—April 7th. Electricity Department. Extra high- and low-voltage cables for twelve months. (See this issue.)

Montrose.—March 27th. Town Council. Electric lighting at Christie's Lane housing estate (twenty houses). Town Clerk.

Newcastle-on-Tyne.—April 24th. Tyne Improvement Commission. Eight 3/1½-ton and two 5/2½-ton electric travelling portal level luffing cranes, or alternatively, ten 3/1½-ton cranes, for the New Quay, North-West Corner, Tyne Dock. The chairman, Tyne Improvement Commission. Bewick Street (deposit £3 3s.).

New Zealand. — WELLINGTON. — May 2nd. Public Works Department. Underground cables, terminal boxes, &c. (T.Y. 19220/39.)*

April 18th. 2,250 yd. of 250-V copper cable and four joint boxes. (T. 20067/39.)*

May 2nd. One distribution switchboard. (T. 20065/39.)*

May 1st. Posts and Telegraph Department. P.i. telephone cable. (T. 19217/39.)*

May 11th. 100,000 coils of Baudot slip and 30,000 coils of transmitting tape. (T. 20144/39.)*

April 28th. Cable. (T. 19214/39.)*

April 27th. Alarm fuses, resistance lamps, key-mountings, resistance spools and resistances. (T. 19743/39.)*

Northumberland. — County Council. Electrical installation at the Seaton Valley Shiremoor senior school. County architect, County Hall, Newcastle-on-Tyne.

Portsmouth.—April 4th. Electricity Undertaking. One 5,000-kVA transformer at the generating station, Gunwharf Road. (March 17th.)

Sheffield.—April 3rd. Electricity Deparment. Complete automatic telephone system for the electricity undertaking. (March 17th.)

South Africa. — JOHANNESBURG.—April 6th. Public Works Department. One electric service lift at the Castle, Cape Town. (T. 19447/39.)*

April 19th. City Council. Thirty miles of copper conductor for overhead transmission lines. (T. 19443/1939.)*

April 15th. Two exhaust fans, complete with all associated equipment. (T. 20207/39.)*

April 12th. Twelve metal-clad, low-voltage, AC switchboards. (T.Y. 19575/39.)*

April 24th. Railways and Harbours Administration. Seven motor alternator sets. (T. 19896/39.)*

April 26th. Two petrol-electric mobile cranes for Port Elizabeth Harbour. (T. 19894/39.)*

April 26th. One two-ton electrically driven portal jib crane for Port Elizabeth Harbour. (T. 19893/39.)*

PRETORIA.—April 6th. Union Tender and Supplies Board. Underground cables. (T. 19446/39.)*

BULAWAYO.—April 3rd. Municipality. Switchboards, transformers, cable and steel poles. (T.Y. 19460/39.)*

Southampton.—March 28th. Electricity Department. Three-phase transformers for twelve months. (March 17th.)

Southern Rhodesia.—SALISBURY.—April 26th. Municipality. Steam accumulator installation and associated auxiliary equipment. (T. 20037/39.)*

April 26th. Two 5,000-kW turbo-alternators, condensing plants and associated auxiliary equipment, including water pumps, spray gear, main switchgear, transformer, &c. (T. 19887/39.)*

Singapore. — April 12th. Municipal Water Department. Two electrically driven pumping sets complete with all electrical gear and spares. (T. 19463/39.)*

Stanley.—April 7th. Electricity Department. Cables, meters, lamps and wiring supplies. (See this issue.)

Stockport.—April 3rd. Electricity Department. Meters, cut-outs, joint boxes, disconnecting boxes and disconnecting pillars for twelve months. (March 17th.)

Uruguay. — MONTEVIDEO.—April 10th. State Electricity Supply and Telephones Administration. Three power transformers. (T.Y. 19593/39.)*

April 11th. Equipment for transformer stations, including circuit-breakers and insulators. (T.Y. 19594/39.)*

Walton and Weybridge.—April 3rd. U.D.C. Erection of the electrical equipment of a new sub-station at Hersham and high-voltage feeder cable. (March 17th.)

Weymouth.—April 4th. Electricity Department. Cable for twelve months and extra-high-voltage switchgear and transformers. (March 17th.)

Orders Placed

Aberdeen. — Housing Committee. Recommended. Electrical work at South Middlefield housing estate (108 houses).—R. A. Mair (£745).

Bedford.—Electricity Committee. Accepted. Switchgear (£3,326).—Met.-Vick. Electrical Co.

Chester.—Electricity Committee. Recommended. Two 33-kV cables (£7,173).—Callender's. Four boiler units, four instrument panels, coal handling plant, one set of overhead coal storage bunkers, ten mild steel supporting columns for bunkers, ash handling plant, pipe-work, &c. (£126,115).—Babcock & Wilcox. Generating plant (£193,577).—B.T.H. Co.

Colchester.—Town Council. Accepted. Electric lighting installation work for the new public library (£206).—Central Electrical Co.

Dartford.—Electricity Committee. Accepted. Cables (£746).—Scottish Cables. Five 235-kVA transformers (£690).—Lindley Thompson & Co.

Dundee.—Education Works Committee. Accepted. Electric lighting and wiring for clock and bell installation at new primary school at Mid-Craigie (£1,054).—R. Kilpatrick & Co.

Glasgow.—Transport Committee. Accepted. Cable (£17,881).—Scottish Cables, Ltd.

Gloucestershire.—Education Committee. Accepted. Electrical work, Kingswood Senior School (£326).—E. R. Orum.

Leeds.—Gas Committee. Accepted. Electrical condenser equipment (£300).—Fuller Elecl. & Manfg. Co.

Health Committee. Accepted in lieu of withdrawn tender. Electrical work at St. James's Hospital (£1,595).—Wallis & Watson.

London.—ISLINGTON.—Electricity Committee. Recommended for twelve months. Wash-boilers. — Burco, Ltd. Water heaters.—Heatrae; Santon. Cookers.—Jackson Electric Stove Co.; Belling & Co.; Hotpoint Electric Appliance Co.

HACKNEY.—Electricity Committee. Recommended for twelve months. Electri-

cal installation cables and cords (£3,803). —Wm. Geipel. DC type non-coin and coin meters.—British Electric Meters. AC single-phase non-coin and coin meters.—Crompton Parkinson; Landis & Gyr. AC single-phase type meters calibrated with current transformers.—Landis & Gyr. Single-phase AC or DC demand indicators.—P. & B. Engineering Co. Three-phase, four-wire, AC demand indicators. —Reason Manufacturing Co. Meter boards and switch blocks (£350).—Sloan Electrical Co.

Manchester.—Housing Committee. Accepted. Electrical installation at Chester Street dwellings.—Hindle, Smart & Co.

Watch Committee. Accepted. Wiring at sites for air raid warning sirens.—Drake & Gorham, Ltd.

Electricity Committee. Accepted. Stand-by battery and charging gear for Barton power station.—Oldham & Son. Sub-contractors for battery-charging set. —Met.-Vick. Elecl. Co.

Newcastle-on-Tyne. — Tyne Improvement Commission. Accepted. Electric crane (£2,536).—Cowans & Sheldon.

Northampton. — Markets Committee. Accepted. Electrical installation at market (£788).—Grensells, Ltd.

Swansea.—Electricity Committee. Accepted for twelve months. Time switches.—G.E.C.; Sangamo Weston. Transformers.—Hackbridge Elec. Constrn. Co. Extra-high-voltage sub-station switchgear.—Ferguson, Pailin; G.E.C.; Met.-Vick. Low-voltage sub-station distribution fuseboards.—Long & Crawford. Fuse handles.—Kartret Switchgear Co. Underground link disconnecting boxes. —Cosway (Sales); W. Lucy & Co. Underground low-voltage cable boxes.—David Evans; Siemens Bros. Cable and extra-high-voltage cable joints.—Callender's. Cooker control units.—J. A. Crabtree & Co. House fusible cut-outs.—B.I. Cables; Electrical Conduits; Falk, Stadelmann; Lighting, Heating & Traction Supplies Co.; Revo; Woodhall & Partners. Feeder pillars.—W. Lucy & Co. Ferrules and cable lugs.—B.I. Cables; Woodhall & Partners. Lamps. — Insular Electric Lamp Works; John Ismay & Sons; Ensign Lamps; Boula Reflector Lamp Co.; British Glow Lamp Works. Meters and demand indicators.—Aron; Electrical Apparatus Co.; Ferranti; Met.-Vick.; P. & B. Engineering Co.; Siemens Electric Lamps & Supplies. Motors and starters. —B.T.H. Co.; Brook Motors; Electric Construction Co.; Morecambe Electrical Equipment Co. Switch pillars.—W. Lucy & Co. Iron-clad air-break switches.—Bill Switchgear; Falk, Stadelmann; Wm. Sanders & Co. (Wednesbury); Westward Electrical Co.; Woodhall & Partners.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aberdeen.—Reconstruction of Royal Mental Hospital (£35,500); medical superintendent.

Addington.—Community centre, gymnasium, &c. (£20,000), for First National Housing Trust, Ltd.; H. S. Scroxton, architect, 10, The Boltons, South Kensington, London, S.W.

Arbroath.—Cinema, for Associated British Cinemas, Ltd.; W. R. Glen, architect to the company, 30, Golden Square, London, W.1.

Bakewell. — Houses (28), Padley, Grindleford; G. Bradbury, Carlton.

Banstead.—Fire station (£18,435), for U.D.C.; Pite, Son & Fairweather, architects, 12, Carteret Street, London, S.W.

Barnsley.—Enlargement of St. Helen's Hospital (£27,200); borough engineer.

Bedale (YORKSHIRE).—Houses (18), for the R.D.C.; J. R. White, architect, County Hall, Northallerton.

Bedworth. — Houses (100), Poplars Farm estate; U.D.C. surveyor.

Birmingham.—Extensions to premises, Cotterills Lane, Saltley, for East Birmingham Allotments, Ltd.; Parsons & Morrin, contractors, Belgrave Road, Edgbaston.

Blaenavon.—Houses (58), Coed Eithen estate; U.D.C. surveyor.

Blantyre (LANARKSHIRE).—Cinema; R. Singleton, chairman of Singleton Cinemas, Ltd.

Border (CUMBERLAND).—Houses (12); R.D.C. housing officer, 5, Victoria Place, Carlisle.

Bradford. — Radium institute, in grounds of Bradford Royal Infirmary, Duckworth Lane; W. J. Morley & Son, 269, Swan Arcade.

Brierfield. — Houses (64), Mansfield estate; U.D.C. surveyor.

Brynmawr.—Houses (78), Twyncyordy estate; U.D.C. surveyor.

Burton Latimer (NORTHAMPTONSHIRE). —Extensions to Co-operative clothing factory, Station Road, for Co-operative Clothing Society.

Cardiff.—Houses (68), Pengam estate, for City Council; city engineer, City Hall.

Carmarthen.—Houses (24), Pontyates and Abergwili; W. E. Jones, R.D.C. surveyor.

Carshalton. — School, Camden Road (£16,469); Thorogood & Sons, 55, Bond Road, Surbiton.

Consett.—Houses (20), Hamsterley; U.D.C. surveyor.

Corby.—Extensions to works, for Stewarts & Lloyds, Ltd.

Coventry.—Houses (83), Dudley Road, Clark Street and Rose Close; Bomyer & Johnson, builders, 321, Anstey Road.

Croydon.—Houses (66), flats and shops, Leighton Street redevelopment area; E. Taberner, town clerk, Town Hall. Large canteen block, Purley Way, for Imperial Airways, Ltd.; M. Lakeman, staff architect, Victoria Station, S.W.1.

Darlington.—Houses (44), three sites, for the T.C.; borough engineer.

Doncaster.—Houses (100), adjoining Sprotborough Road, Bentley; W. D. Leadley, builder, High Street, Askern, Doncaster.

Dorchester.—Extensions to printing works, High East Street; H. Ling, Ltd.

Eccles.—Houses (41), Trevor Road, Monton; G. H. Knowles and Valentine.

Edinburgh.—Sports pavilion, Goldenacre (£13,400), for Governors of George Heriots Trust; the secretary.

Elstree. — Garden city development (470-acre site) facing Barnet by-pass; John Laing & Sons, building contractors, Mill Hill, N.W.7.

Felling-on-Tyne. — Flats (48), Bill Quay; F. Buffham, builder, Beach Villa, Beach Road, South Shields.

Gateshead. — Premises for Gateshead Dispensary (£12,000); Fennell and Bradley, architects, 16, West Street.

Girvan.—Houses (86); burgh surveyor.

Glamorganshire.—School, Pantteg, for the County Council, County Hall, Cardiff.

Glasgow. — Houses (30), Shawholm Street; housing director. Houses (500), Yoker, &c.; architect, housing department. Cinema, Paisley Road; Campbell, Cochran & Co. Cinema projection room at Gartloch Mental Hospital, for Corporation Public Health Department; city architect. Retail store, Argyle Street (five storeys), for the Thrift Estates, Ltd., Civic House, Great Charles Street, Birmingham.

Halifax.—Flats (30), Shaw Royd estate, Sedbergh Road; Housing Improvements (Halifax), Ltd.

Haltwhistle.—Maternity hospital; Wallace and Sons, builders, Hexham.

Harrogate.—Store premises, Cambridge Street, for Marks & Spencer, Ltd.; Bovis, Ltd., contractors, Stanhope Street, London, W.1.

Harrow. — Isolation hospital, for U.D.C.; E. Stanley Hall, architect, 54, Bedford Square, London, W.C.1.

Hebburn-on-Tyne. — Houses (22), Prendwick Avenue; S. and H. Oake, builders, Victoria Road.

Heckmondwike. — Houses (80), Dale Lane site; F. W. Littlewood, U.D.C. surveyor.

Hetton (Co. DURHAM).—Additions to miners' welfare hall (£2,000); Wright and Kellett, Ltd., builders, Finchdale Terrace, Chester-le-Street.

Hinckley.—Houses (22), Belle Vue estate, Earl Shilton, for U.D.C.; H. Farmer & Co., contractors, Clarendon Road, Hinckley.

Lancashire.—Clinic, Huyton (£6,227), for the C.C. Enlargement of Earlstown central school (£42,115), for the County E.C., Lancaster.

Leeds.—Houses (846), Seacroft estate; Sherriff & Co., Ltd. Children's hospital, Moortown estate; J. Stinton Jones, consulting engineer, Victoria House, Vernon Place, London, W.C.1. Flats (471), Marsh Lane; N. B. Bell & Co., Ltd.

Lincolnshire.—Library building, Cleethorpes (£6,000), schools, Brigg (£28,000), Hogsthorpe (£10,200), and Scunthorpe (£70,000), and improvements to junior school, Goxhill (£4,000); County Council, Lincoln.

Loehgelly.—Houses (120), with electric lighting, Lumphinnans Road site, for T.C.; A. Watson, architect, 24, Queen Ann Street, Dunfermline.

London. — (ISLINGTON). — Tenements (56), Highbury Park; Haymills, Ltd. (PADDINGTON).—Development of Clarendon Street area; Miss E. Denby, housing consultant, 11, Princes Street, Hanover Square, W.1. Extensions to Town Hall, Paddington Green (£100,000), for B.C.; W. & E. Hunt, architects, Lancaster Place, W.C.2. (HAMMERSMITH).—Extensions to School of Obstetrics, Queen Charlotte's Hospital; Stanley Hall & Easton & Robertson, 54, Bedford Square, W.C.1. Rebuilding of Flora Gardens school (£32,715); L.C.C. architect, County Hall, Westminster Bridge Road, S.E.1.

Lothians.—Works for Scottish Oils, Ltd.; the manager.

Lowestoft.—Houses (22), Normanston Drive; borough engineer.

Meriden.—Houses (151), Water Orton Road and Green Lanes, Castle Bromwich; W. B. Good, New John Street West, Birmingham.

Mildenhall.—Houses (134), West Row, &c., for R.D.C.; Fidler & Sons, Ltd., builders, Leiston, Suffolk.

Newcastle-on-Tyne.—Factory, Benfield Road, for Messrs. McClure, Cheviot Street, Byker, Newcastle-on-Tyne; T. E. Ridley, contractor, 7, Moor Crescent, Gosforth. Offices, Heaton, for the City Transport; J. and W. Lowry, contractors, Corporation Street.

Northampton.—Alterations to Castle Goods Station (£25,000), for the L.M.S. Railway.

Northumberland.—Police houses, Whitley Bay, Monkseaton, Blyth, Willington Square, Alnwick and Gosforth (£7,300); county architect, County Hall, Newcastle-on-Tyne.

Penmaenmawr.—Police station, for Caernarvonshire Standing Joint Committee; county architect, County Offices, Caernarvon.

Penrith.—Houses (50), Friarage estate; U.D.C. surveyor. Estate development, Skirsgill Gardens; Mr. Knewstubb, architect.

Risca.—Houses (104), Gelli Pitill estate; U.D.C. surveyor.

Shrewsbury.—Cinema, Bridge Street; E. S. Roberts, architects, Great Charles Street, Birmingham.

Shropshire.—School, Morton, near Oswestry, for E.C.; A. G. Chant, county architect, 5, Belmont, Shrewsbury.

South Bank (YORKSHIRE).—R.C. school; Thornton Construction Co., builders, 30, Bridge Street, Stockton-on-Tees.

Southsea.—Ice rink (£130,000), for Portsmouth Arena, Ltd.

Stanley (Co. DURHAM).—Swimming baths (£20,000), King's Head Field; A. Routledge, U.D.C. surveyor.

Sunderland.—Factory, Grangetown, for Messrs. Robinson; J. Huntley and Sons, contractors, Marion Street.

Surbiton.—Houses (64), Clayton Road, Hook; borough surveyor.

Surrey.—Central laundry (£84,185), for the C.C.; G. Parker & Sons, Ltd., 124, Sumner Road, S.E.15. Gymnasium to County Boys' school, Sutton (£5,211), for the County E.C.

Swadlincote.—Houses (104) and bungalows, Oversetts housing estate, for U.D.C.; R. Hustwayte, contractors, Haydn Road, Sherwood, Nottingham.

Thedwastre.—Houses (70), for R.D.C.; Hunt & Coates, architects, 51a, Abbeygate Street, Bury St. Edmunds.

Thirsk (YORKSHIRE).—Houses (74), for the R.D.C., Sutton Road estate; C. W. C. Needham, architect, 3, Duncombe Place, York.

Urmston.—Factory, Lyons Road; Geigy Colour Co., Ltd.

Wishaw.—Houses (240), for T.C.

Yorkshire.—School, Whitwood Mere, Normanton, for the West Riding E.C.; P. D. Hepworth, architect, 7, Gray's Inn Place, London, W.C.1.